PREDICTORS OF MORBIDITY AND HEALTH RELATED QUALITY OF LIFE IN CHILDREN WITH SPINA BIFIDA APERTA

A DISSERTATION SUBMITTED TO THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY, IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE MCh. PAEDIATRIC SURGERY EXAMINATION TO BE HELD IN AUGUST 2014

Certificate

This is to certify that the dissertation entitled

Predictors of morbidity and health related quality of life in children with spina bifida aperta

Is a bonafide work done by **Dr. Jujju Jacob Kurian**

Senior postgraduate student in the

Department of Paediatric Surgery, Christian Medical College, Vellore,

In partial fulfillment of the

Tamil Nadu Dr. M.G.R. Medical University, rules and regulations,

For the award of the degree of **MCh. Paediatric Surgery**

Under my guidance and supervision during the academic year **2014**

Guide

DR. JOHN MATHAI
Professor
Paediatric Surgery Unit II
Christian Medical College
Vellore 632004

Head of the Department

DR. SUDIPTA SEN
Professor& Head of
Paediatric Surgery
Christian Medical College
Vellore 632004

Principal

DR. ALFRED JOB DANIEL
Christian Medical College
Vellore 632004

ACKNOWLEDGEMENTS

I am grateful to God almighty for giving me an opportunity to study this congenital anomaly.

To Dr John Mathai who has been more than a guide. He mentored me with extreme patience, and took great care in going through this thesis and giving it a direction.

To Dr Sudipta Sen, a great teacher and mentor, who provided me with valuable suggestions.

To Dr Sampath Karl and Dr Reju Thomas who has given me their full support in my endeavour.

To all my colleagues who gave their complete support and valuable suggestions.

To Mrs. Grace Rebekah, for the help she rendered with the analysis.

To my family, for their unconditional love and support.

ABSTRACT

Title: Predictors of Morbidity and Health related quality of life in children with Spina bifida aperta

Aim/ Objectives: To assess in childen with spina bifida aperta, the quality of life, renal impairment, various morbidity factors and those on various management modalities for neurogenic bowel and bladder.

Materials and methods: 68 children with spina bifida aperta were assessed. A history which included general data, bowel or bladder related accidents and the number of garments changes per day was taken. A clinical examination enumerating the lesion, presence of co morbidities, anthropometry and neurological examination were performed.

A urine microscopy, serum creatinine and ultrasound of the abdomen were done and if abnormal were followed by a MCU and CMG. DMSA was done in case of VUR. All children who were 5 years or more were administered questionnaires to assess the quality of life. The data was entered in Microsoft excel and analyzed using SPSS 16.

Results and conclusion: 31% of children were found to have poor quality of life. 38.24% of children had evidence of renal changes as evidenced by dilated upper tracts and/ or scarring at the time of evaluation. Urinary incontinence was seen in 68.9% and faecal incontinence in 61.29%. 38.09% of children were not ambulant and hydrocephalus was seen in 11.76%. 58.82%

of children were on CIC whereas 35.48% were on bowel washes. None of the children had mental retardation.

TABLE OF CONTENTS

INTRODUCTION

Spina bifida is a congenital neural tube defect that results in incomplete closure of the spinal column. Children with spina bifida aperta which includes meningocoele, meningomyelocoele and lipomeningocoele suffer from various systemic problems. The most commonly involved systems are the genitourinary system, the gastrointestinal system, the musculoskeletal system and the central nervous system.

Advances in neurosurgical, orthopaedic and urological management of these children have resulted in a better life expectancy and a better quality of life especially in the developed world. Key elements in the management of these children include early closure of the defect with institution of appropriate medical, surgical and supportive measures and lifelong follow up.

Studies on the health related quality of life in children with spina bifida aperta especially from our country have been very few. Knowledge of their quality of life with respect to the general population, the various morbidity factors affecting them and the time of development of one of the most important cause of mortality namely renal impairment may go a long way in helping the clinicians and the care givers improve their quality of life.

AIMS AND OBJECTIVES

AIM:

To evaluate children with spina bifida aperta who presented to our hospital during 2003 to 2013.

OBJECTIVES:

1. To evaluate the Quality of life (QoL) in school going children with Spina bifida aperta.

2. To identify the proportion of children having renal impairment at the time of presentation.

3. To assess the proportion of children having the various morbidity factors namely

Urinary incontinence

Fecal incontinence

Mental retardation

Mobility problems

4. To assess the proportion of children requiring the various management modalities in neurogenic bowel and bladder namely

Clean intermittent catheterization with or without Mitrofanoff procedure

Double voiding

Bowel enemas

Malone's antegrade continent enemas.

REVIEW OF LITERATURE

History and Aetiopathogenesis:

Spina bifida is a congenital anomaly of the central nervous system. There are mainly three types of spina bifida: spina bifida occulta, meningocoele and meningomyelocoele. Meningocoele and meningomyelocoele together are called spina bifida aperta. In spina bifida occulta there is a defect in one or more of the spinal vertebra without any sac. In meningocoele, which is least common variety, there is a sac which is formed by the membranes that covers the spinal cord namely the meninges and this sac protrudes through a defect in the vertebra. The content of the sac is only cerebrospinal fluid. In meningomyelocoele there is a sac formed by the meninges protruding through a defect in the vertebral column, with the contents of the sac being spinal cord, spinal nerve roots and cerebrospinal fluid.

Historically spina bifida has been documented dating as far back as 1500 B.C. However lack of further literature on the subject would suggest that the disease was considered hopeless and therefore insignificant. The commonly used surgical methods at that time involved amputation of the neural sac and aspiration. The results were almost always fatal, due to CSF leak, meningitis and untreated hydrocephalus. Nicholas Tulp in 1641 and Fredrick Ruysch in 1691 were among the first to conduct extensive case studies on spina bifida. These studies included an accurate physical description of the disorder, while stating that the condition was completely untreatable.

However better understanding of the pathophysiology of the disease and improved surgical techniques by the late nineteen and the early twentieth century resulted in improved rates of mortality and morbidity. Excision of the sac with primary skin closure was introduced by Lister while the use of musculo-facial flaps for closure of the defect was introduced by Bayer (1).

The world wide incidence of spina bifida is about 1-3 per 1000 births (2) while the incidence in India is about 3.9-8.8 per 1000 birth (3). The world wide prevalence of the disease has been on the decline mainly because of better antenatal care, better nutrition and timely folic acid supplementation (4).

The exact reason for the occurrence of spina bifida has not been found out yet but genetic and environmental factors including maternal diabetes, obesity, antiepileptic drugs like valproate, phenytoin, antimalarial drugs, folate antagonists like aminopterin, alcohol, mitomycin C and hypervitaminosis A are said to play a role (5),(6). Abnormalities in the homeobox gene have been recently implicated as a causative factor in the development of neural tube defects. It can occur either sporadically or in association with other congenital anomalies.

Embryology

The process of formation of the brain and spinal cord is called neurulation. Embryogenesis in the first 2 months of gestation can be divided into 23 stages. Neural plate is formed in the 8^{th} stage at around the 18^{th} day. This is followed by formation of the neural folds and their subsequent fusion. The caudal expansion of the neural tube and its subsequent closure is completed by day 25. The most caudal portion of the spinal cord is formed by a process of

secondary neurulation. Spina bifida aperta is a defect in the primary neurulation where the caudal region of the neural tube fails to fuse (7). Defect in secondary neurulation causes occult spinal dysraphism.

Pathophysiology and Management

Spina bifida aperta can occur anywhere in the back from the cervical to the sacral region with the lumbo-sacral area being the most commonly affected. The immediate management of spina bifida aperta is to repair and close the lesion in the back. It is either done as an emergency in a ruptured variety with CSF leak or electively in the non ruptured type. The extent of neurological dysfunction cannot be predicted by the clinical appearance of the lesion. The organs usually involved are the kidney and urinary bladder, the bowel and the lower limbs. The neurological dysfunction that affects the various systems is the reason for the major morbidity and mortality seen in a case of spina bifida aperta.

The neurological dysfunction that occurs in spina bifida aperta can either be congenital/ early or late. In the first category the child will be born with the neurological deficits due to defective spinal nerves. The most common cause for late deterioration is tethering of the spinal cord. Tethering of the spinal cord can manifest as deterioration in motor power or gait, pain, altered sensation, changes in bladder function, and new onset of deformity in the legs and spine. Here the spinal cord is held in the original position and is prevented from ascending within the thecal sac during growth of the individual. The causes implicated for the neurological dysfunction are: 1. Sustained traction on the cord with growth of the bony spine leads to stretching of the cord and neuronal disruption. 2. Ischemia of the cord. 3. Repeated

hyper flexion of the spine like during sports activities causes acute neuronal injury at the site of tethering (8).

As this is a dynamic problem it cannot be identified with static investigations like MRI and CT. If tethering is the cause for neurological deterioration then treatment should be aimed at removal of the tissue causing tethering and thereby releasing the cord.

Neurological dysfunction can result in abnormalities of the genitourinary system, the gastrointestinal system, the musculoskeletal system and the central nervous system. The various system anomalies are discussed below.

Genitourinary system: Micturition is a spinal reflex modulated by the central nervous system. The bladder and the urethra are innervated by three sets of peripheral nerves arising from the autonomic nervous system and the somatic nerves. Under normal conditions the detrusor, bladder neck and the external sphincter act in synergy to store urine and evacuate it completely at an appropriate time. The changes in the storage pressure of bladder between it being empty and full is less than 10-15 cm of water. This property of the bladder is known as accommodation. The normal voiding pressure ranges from 50-80 cm of water for a male and 40-65 cm of water for a female. When the filling pressure exceeds 40 cm of water, it leads to reduced glomerular filtration, decrease ureteral drainage, obstructive hydronephrosis and vesico ureteric reflux.

Majority of children with spina bifida aperta are known to have neurogenic bladders. The reason being disordered innervation of the detrusor and the external sphincter resulting in detrusor- sphincter dyssynergia (9). Here reflex relaxation of the external sphincter that occurs

when the detrusor contracts is lost. This initially causes detrusor hyperreflexia where there is intermittent elevation in the filling pressure to more than 40 cm of water (10). Persistence of dyssynergia results in muscular hypertonia with collagen deposition causing persistent elevation of filling pressure, or detrusor decompensation which is also known as myogenic failure. In some children, the bladder may function reasonably well, but the urinary sphincter may be weak, sometimes called intrinsic sphincter dysfunction. These children are not able to hold urine and may leak even when their bladder is not reached full capacity.

At one end of the spectrum is a hyperactive poorly compliant bladder (muscular hypertonia) which tends to be small, and does not hold urine well resulting in urinary incontinence. The bladder pressures are very high leading to back-pressure changes to the kidneys resulting in hydronephrosis or hydroureteronephrosis and renal damage if left unchecked over a long period of time. At the other end of the spectrum, there is a hypotonic neurogenic bladder (myogenic failure). In these children, the bladder is large and lax albeit with improper emptying. These children tend to have a full bladder all of the time and may be prone to urinary tract infections. In addition, if the bladder gets too full, they may have overflow incontinence.

The classification of neurogenic bladder has been given by the Urology section of the American Academy of Paediatrics in conjunction with the Urodynamic Society's classification, the International Continence Society and most recently the International Children's Continence Society (11).

The classification is based on dysfunction of a specific area rather than aetiology.

1. Storage: Based on detrusor tone and urethral closing mechanism.

Detrusor tone can be normal or increased as in cases of non-elastic, hyperreflexic bladder.

Urethral closing mechanism is based on competence of the bladder neck and the external sphincter. Incompetence can result in non reciprocal activity or periodic hypoactivity.

2. Evacuation: is based on detrusor contraction and urethral closing mechanism.

Detrusor contraction can be normal or underactive (areflexic or hypoactive).

Defects in urethral closing mechanism can be due to non synchronous action between the bladder neck and the external sphincter.

The major goal to be attained in managing a neurogenic bladder is to make the bladder a low, safe pressure zone inorder to protect the kidneys from urinary tract infections and back pressure changes. Other goals are prevention of urinary incontinence, and management of any associated vesicoureteric reflux (12). A complete assessment and individualized management is required for these children. In addition, neurogenic bladders can change over time. Thus these children need to be on follow up their entire life. Investigations like serum creatinine and ultrasound abdomen helps in quantifying the degree of renal impairment. Ultrasound also helps in assessing the bladder thickness and presence of a significant post void residue. A Micturating Cystourethrogram (MCU) helps in identifying vesico ureteric reflux, bladder capacity and evaluating the anatomy of the bladder and bladder neck. A DMSA is useful in identifying renal scars in the setting of reflux and a cystometrogram (CMG) helps in determining the type of bladder and sphincter problem.

The mainstay of treatment in these children is early characterization and institution of proactive therapy. Clean Intermittent Catheterization (CIC) (13) in combination with anticholinergics is the standard therapy for children with neurogenic bladder (14). CIC was a landmark

intervention in Pediatric Urology and was first described by Lapides (15) at the University of Michigan. CIC involves passing a small, soft catheter through the urethra into the bladder to empty the bladder in order to prevent infections and incontinence. Catheters are made of a soft silastic plastic material to prevent exposure to latex and development of latex allergies (16). Lately, newer catheters with hydrophilic coatings have been introduced which makes it very slippery and allows it to pass through the urethra without much friction or discomfort. Most of the urinary tract infections in children with neurogenic bladders are caused by urinary stasis and if the urine is emptied completely, this will help prevent infection. Thus, although it seem counter-intuitive, the best treatment to prevent infections and incontinence in children with neurogenic bladders is to empty the bladder with CIC. To further protect against infections, some catheters are impregnated with antibiotic coatings as well. If catheterization through the urethra is difficult, alternative catheterizable channels using the appendix which is known as Mitrofanoff and bowel which is known as Monti tube have been described. CIC also allows bladder emptying before the occurrence of an otherwise spontaneous 'high pressure voiding' which is detrimental for the kidneys.

Anticholinergic medications like oxybutynin is a bladder smooth muscle relaxant. It is a M3 selective receptor antagonist with antispasmodic, local anaesthetic and calcium channel blocking action (17). It helps in improving the bladder dynamics by suppressing hyperreflexia and hypertonia causing reduction of high pressure bladder storage and high pressure emptying with increase in capacity of the neurogenic bladder (18). The action of these medications is mainly confined to the detrusor with little effect on the sphincter. The usual oral dose is 0.3-0.6 mg/kg/day in three divided doses.

In children with ineffective response to oral oxybutynin, intravesical instillation of the same drug has been found to be highly efficacious (19),(20). It was found that more potent and longer duration of action of intravesical oxybutynin was due to reduced first pass metabolism (21) and due to a direct local effect on the detrusor on intravesical instillation. Intravesical oxybutynin can be administered upto 0.9 mg/kg/day. Newer anticholinergic like tolterodine is given in those who are not tolerating oxybutynin. Intravesical instillation of botulinum toxin A and and resiniferatoxin (22) can be given to patients not responding to anticholinergics. In the case of a lax sphincter, sympathomimetics are given to increase the tone of the sphincter (23).

Though CIC and drugs are effective in many cases some children will continue to have or may later develop high pressure poorly compliant bladders. These children are at a risk for renal damage. In such cases, surgery to enlarge the bladder with simultaneous decrease in bladder pressure may be considered. This is called bladder augmentation (24) and uses a piece of hollow viscous mostly from the gastro intestinal tract to augment, or enlarge, the bladder. This is a very effective procedure to reduce the bladder pressures and prevent upper tract changes. The only downside of this procedure is that lifelong washes and medication is needed and there is a small risk of malignancy (25). If necessary, procedures to correct vesicoureteric reflux and narrow the bladder neck may also be performed along with augmentation. There are various forms of bladder neck reconstruction which help in increasing the bladder outlet resistance to correct urinary incontinence.

Gastrointestinal tract: Normal bowel function depends on the rectal sensation, patency of the sphincter complex and effective peristalsis. Children with spina bifida aperta often have

neurogenic dysfunction of the bowel resulting in constipation or fecal incontinence (26). While bowel accidents often seem like diarrhea, it is of a spurious nature as most of the bowel contents are well formed. Fecal continence has been proven to have a considerable impact on social life (27). Management of neurogenic bowel involves a patient oriented program. For mobile patients rectal enemas with normal saline and a mild irritant like glycerine are useful. In patients who are not mobile and in those with severe incontinence which is not controlled with rectal enemas, an Ante grade Continent Enema (ACE) using the existing appendix or a newly created conduit that acts as a catheterizable channel to gain access to the colon has been described by Malone (MACE) (28). Low profile caecostomy tubes with stopper buttons called trap door Chait catheters (29) which can be introduced percutaneously or laparoscopically (18) are also in vogue.

Musculoskeletal problems: There are various orthopedic problems associated with MMC. Deformities follow three patterns: 1. prenatal uterine pressure on paralyzed limbs; 2. postnatal causes which are either postural or secondary to muscular imbalance and 3.defective innervation of the muscles leading to atrophy of the legs. As paralysis happens in the fetus, orthopedic problems like clubfoot, arthrogryposis of the legs and developmental dysplasia of hip is usually seen at birth. Kyphosis is sometimes present and can hinder surgical closure thereby preventing the child from lying supine. Scoliosis (30) may develop later and is more common among children with higher lesions (i.e. above L3). Other associated anomalies are congenital fusion of the vertebra, congenital lumbo sacral spondylolisthesis, hypoplasia of the sacrum and abnormal ribs (31).

Another important factor to be considered is the absence of sensation in the lower extremities resulting in the formation of pressure sore. There can be spastic or flaccid paralysis depending on the level of lesion. Prognosis varies by the level of cord involvement and the number and severity of associated anomalies. Prognosis is worse for children with higher cord level (e.g. thoracic) lesions or who have kyphosis and other associated congenital anomalies. With correction of the orthopaedic anomaly and proper conservative care, most children do well.

Central nervous system anomalies: The most common CNS anomaly seen in patients with spina bifida aperta is hydrocephalus. The incidence of hydrocephalus in these children are said to be around 80% (32) according to Western literature. The reason for hydrocephalus has been postulated to be due to aqueduct stenosis (33) and Arnold Chiari malformation type 2 (34). When significant hydrocephalus occurs, white matter fibers such as the corpus callosum are often stretched resulting in abnormal spatial and motor skills. It also causes selective thinning of posterior brain regions which are associated with the development of spatial skills.

In type 2 Chiari malformation, there is cerebellar hypoplasia with caudal displacement of the hindbrain through the foramen magnum. This obstructs the outflow of cerebrospinal fluid (CSF) from the fourth ventricle. The end result is progressive hydrocephalus which may be diverted through a ventriculo-peritoneal shunt. The cerebellum is responsible for fine motor functions and is also a gateway for a variety of skills that involve attention, planning, and learning.

There are various defects associated with Arnold- Chiari malformation which are:

-Cranial Nerve Palsies and visual deficits due to the enlarged ventricles compressing on the adjacent brain structures

-Cognitive and perceptual problems namely lower intellect, memory deficits and distractibility

-Cocktail party personality which is chattering speech with limited content and visual perceptual deficits.

-Motor dysfunction in the form of in-coordinated halting and deliberate movements instead of smooth and continuous.

-Spasticity due to upper motor neuron type lesion (35).

It is a lesser known fact that many children with spina bifida aperta have other congenital brain anomalies like partial agenesis of the corpus callosum. Since the corpus callosum is the major fiber pathway connecting the two cerebral hemispheres, agenesis results in reduced communication between the two cerebral hemispheres causing abnormalities in spatial and motor skills. Despite the extent to which the central nervous system is altered, few children are mentally deficient though some are simply characterized as slow learners.

Children with spina bifida aperta have a particular type of learning disability called a "non-verbal" learning disability. Non-verbal learning disability is characterized by problems with mathematics and writing while reading and comprehension is fairly well preserved. In

particular, word recognition and spelling skills are often well developed. This is also associated with social problems, particularly when the child enters adolescence. As adolescents, some children with spina bifida aperta may become more lethargic and somewhat depressive, showing tendencies towards social isolation.

Many children with spina bifida aperta have difficulties with memory and attention. These problems are not well understood, but often manifests as difficulties with attention span, attention shifting, and controlling the focus of attention. This reflects a reduction in the level of arousal and alertness and is different from the attention problem seen in Attention Deficit Hyperactivity disorder (ADHD) children. The attention problems that characterize many children with spina bifida aperta tend to be under detected and under treated. These behaviors, along with the manifestations of reduced arousal are often interpreted as passivity, lack of interest in learning, and poor motivation by many individuals in school settings (36).

Other problems: Development of latex allergy is another factor that needs to be considered in these children (37). Latex is found in a lot of materials including red rubber catheters, medical gloves and medical equipment. These children may come in contact with latex while performing clean intermittent catheterization and during surgical interventions. Thus they are at a high risk of developing latex allergies which can be quite severe and life threatening. Therefore, attempts to avoid latex exposure and sensitization are warranted to help protect against latex allergies

Importance of folic acid in prevention (38),(39) of spina bifida has to be emphasized strongly mainly with health education . Folic acid is required for normal neural tube formation and has a protective effect against the development of spina bifida. Folic acid is supplemented as a dietary or vitamin supplement at 400 micrograms per day to women of child bearing age commencing three months prior to conception (40).

While meningitis is a common cause of death in an infant with spina bifida, renal failure and ventricular shunt complications are the usual causes of death in older children. For this reason after initiation of appropriate treatment for the various problems, a lifelong follow up is mandatory. Studies on the health related quality of life in children with meningomyelocele especially from our country have been very few. Knowledge of their quality of life with respect to the general population, various morbidity factors affecting them and the time of development of one of the most important cause of mortality viz. renal impairment may go a long way in helping the clinicians and the care givers improve their quality of life.

MATERIALS AND METHODS

The purpose of this study was to evaluate children with spina bifida aperta who were treated in the Departments of Paediatrics and Paediatric Surgery during 2003 to 2013. Patient details were obtained from the operation notes and the IP records maintained in the department.

Patients

A total of 68 patients with spina bifida aperta who came for follow up were evaluated. They were further divided into two categories- five years or more and less than five years.

Inclusion criteria

All patients with a diagnosis of meningocoele, lipomeningocoele and meningomyelocele who were treated in the Department of Paediatrics and Paediatric Surgery between the years 2003 – 2013 were included in the study.

Exclusion criteria

All cases of spina bifida occulta were excluded.

Methodology

All children with spina bifida aperta who followed up in Paediatric surgery following the intimation were evaluated. The children were further divided into two groups: one that was five years or more and the other which was less than five years. In all children a history which included age, gender, date of birth, place and type of delivery and gestational age at the time of

delivery, any bowel or bladder related accidents and the number of changes of garments per day was taken. Further a clinical examination which included enumerating the type of lesion, the vertebral levels involved, presence of co morbidities, anthropometry, motor power at the hip, knee and ankle, contractures if any, sensory level, saddle anesthesia, presence of sores, reflexes like anal wink and bulbocavernosus, bladder sensation if present, whether the bladder is palpable or expressible and the presence of rectal sensation was assessed

Laboratory investigations like urine microscopy, serum creatinine and an ultrasound of the abdomen was done initially. If these preliminary investigations showed any abnormality a MCU and CMG (optional- was not done in infants) was done. If the MCU revealed a VUR then a DMSA scan was done.

In children who were 5 or more, a quality of life assessment was also done along with the above mentioned assessment. Four instruments namely Barthel activities of daily living index, PIN-Q for paediatric urinary incontinence quality of life, Visual analogue score for general quality of life and a patient generated index was administered and the quality of life with respect to disability was assessed.

The data was entered in Microsoft excel and analysis done using SPSS. Descriptive statistics were reported using mean with or without standard deviation and median with IQR. Continuous variables were reported with ‘n’ and ‘%’ was used for categorical variables. Relation between the three quality of life instruments was assessed by Pearson’s correlation. Simple linear regression was used to quantify the relation and Chi square test was used to find the association between the three instruments.

RESULTS AND ANALYSIS

A total of 68 children were assessed. They were divided into two groups. The first group comprised of children who were 5 years or more. The second group comprised of children who were less than 5 years, 19 of whom were infants. The male female distribution of each group is summarized below.

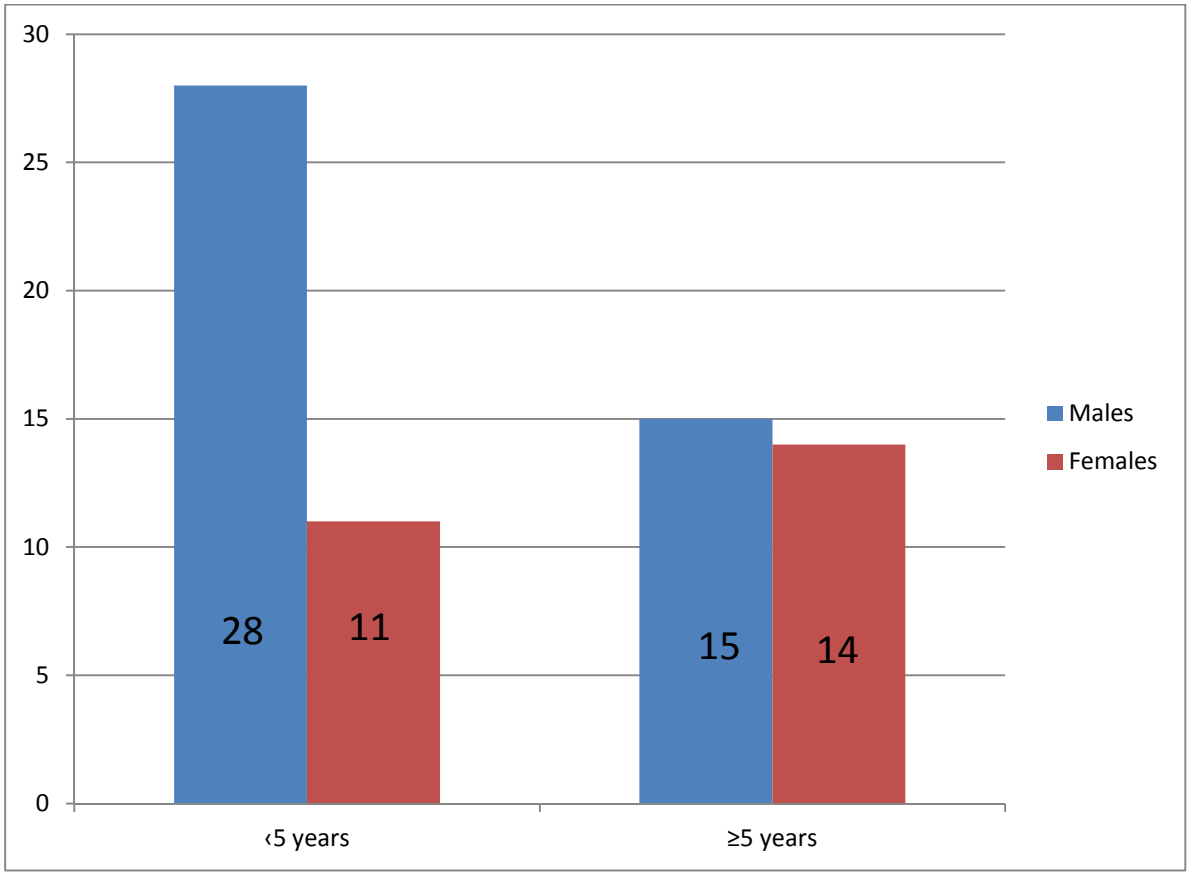


Fig 1: Distribution According to age and Gender

The patients were classified depending on whether the primary lesion was a meningomyelocoele (MMC), a meningocoele (MC) or a lipomeningocoele (LMC) (Illustration.1, 2, 3). The results are summarized below in fig.2.

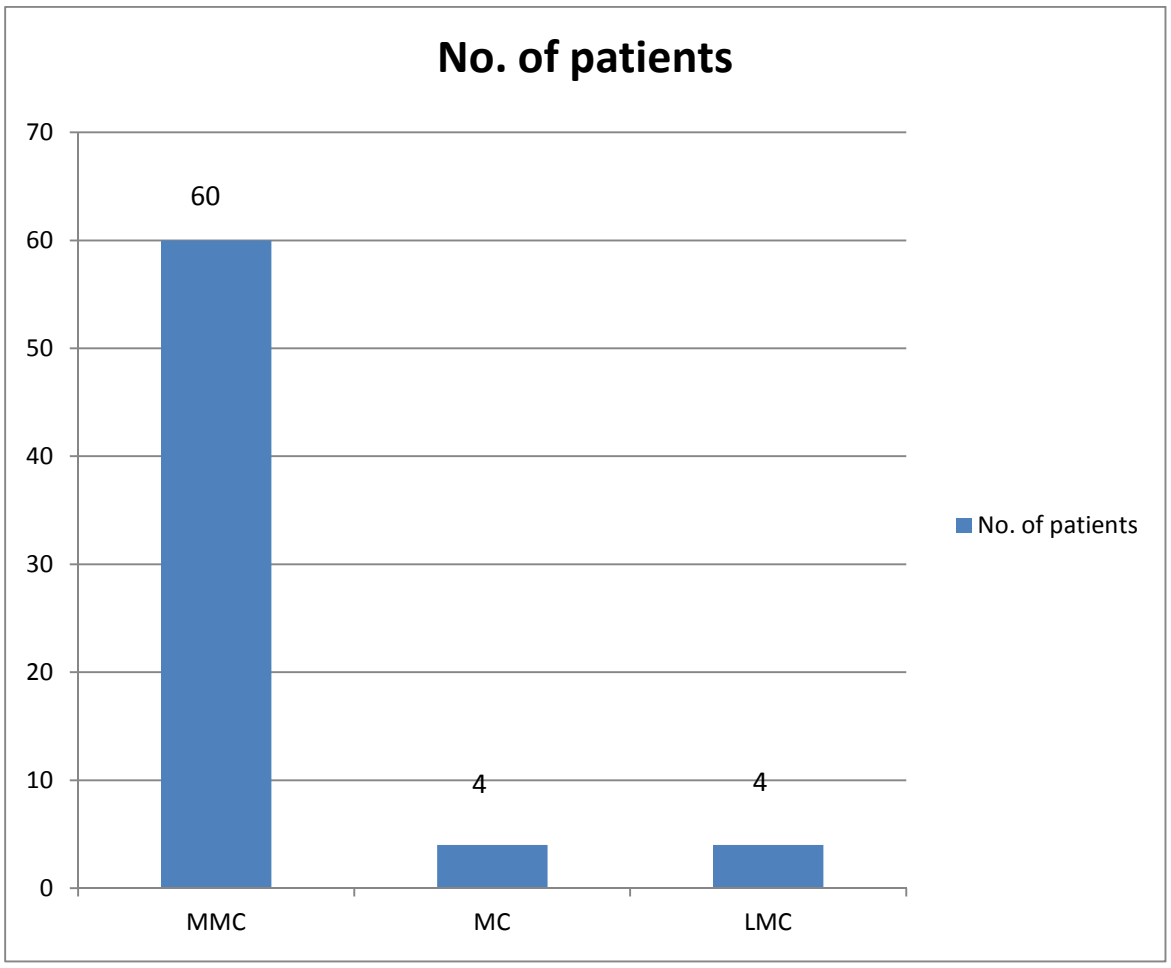


Fig. 2: Distribution of Patients (MMC- Meningomyelocoele, MC- Meningocoele, LMC- Lipomeningocoele)

Further classification was done depending on the level of the lesion. The results are summarized in table 1.

LEVEL OF LESION	n= 68
Thoracic	3
Lumbar	31
Lumbar and sacral	17
Sacral	17

Table 1: Level of lesion

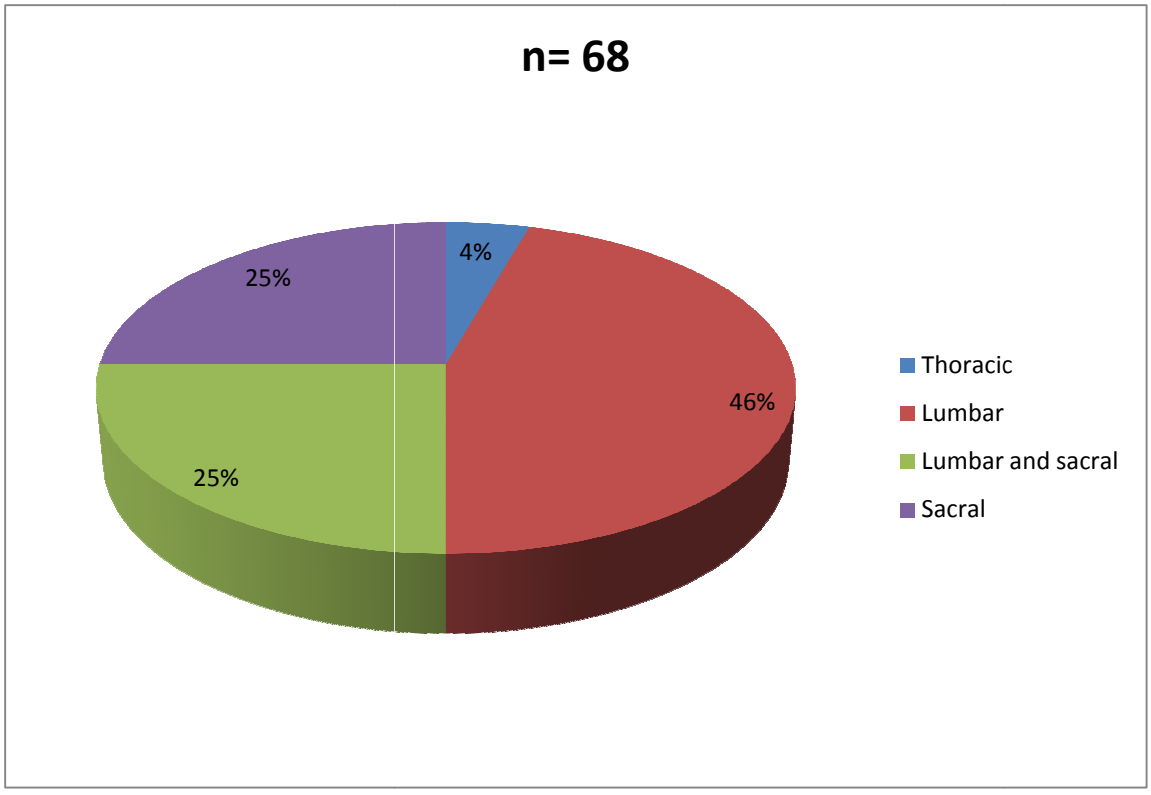


Fig. 3: Percentage distribution of the levels of lesion encountered.

The various morbidity factors affecting children more than 5 years were grouped into three categories. They were incontinence (bowel and bladder), mobility problems and central nervous system problems. A total of 22 patients had incontinence, 16 had mobility problems and 5 had CNS problems. The results are summarized in the Venn diagram given below.

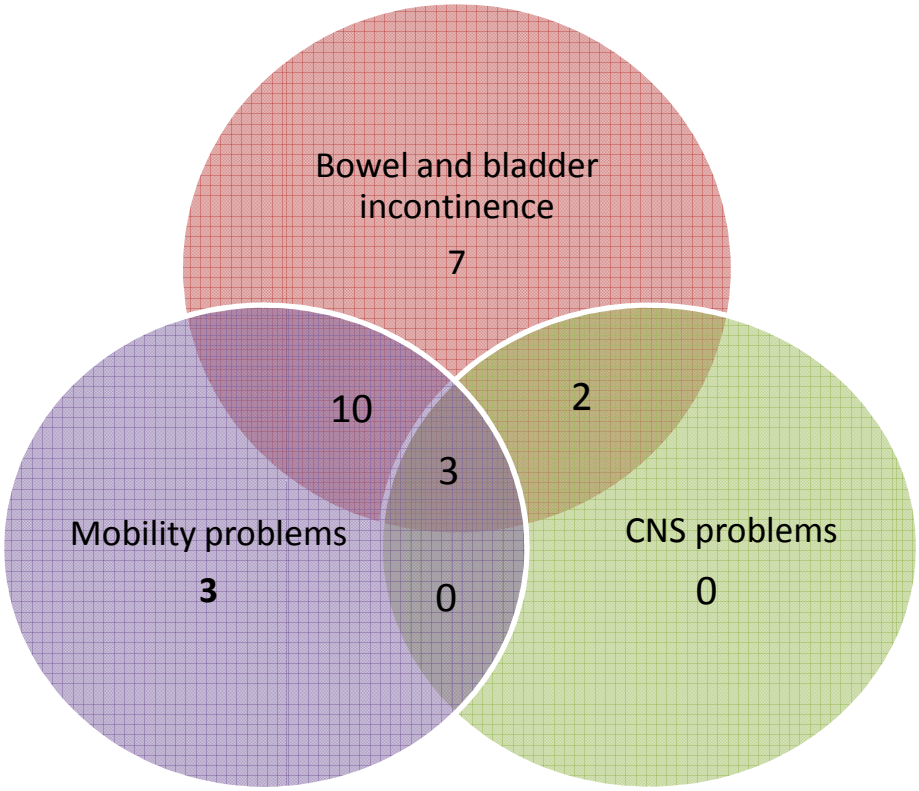


Fig. 4: Morbidity factors depicted in a Venn diagram

The children who were five years or more with bowel incontinence (referring to those who had an occasional accident or those who were incontinent and required enemas) and bladder incontinence (referring to those who are catheterized or are having daily accidents) were further sub-classified. There were 2 children who only had bowel incontinence, 4 children with only bladder incontinence and 16 children who had both bowel and bladder incontinence.

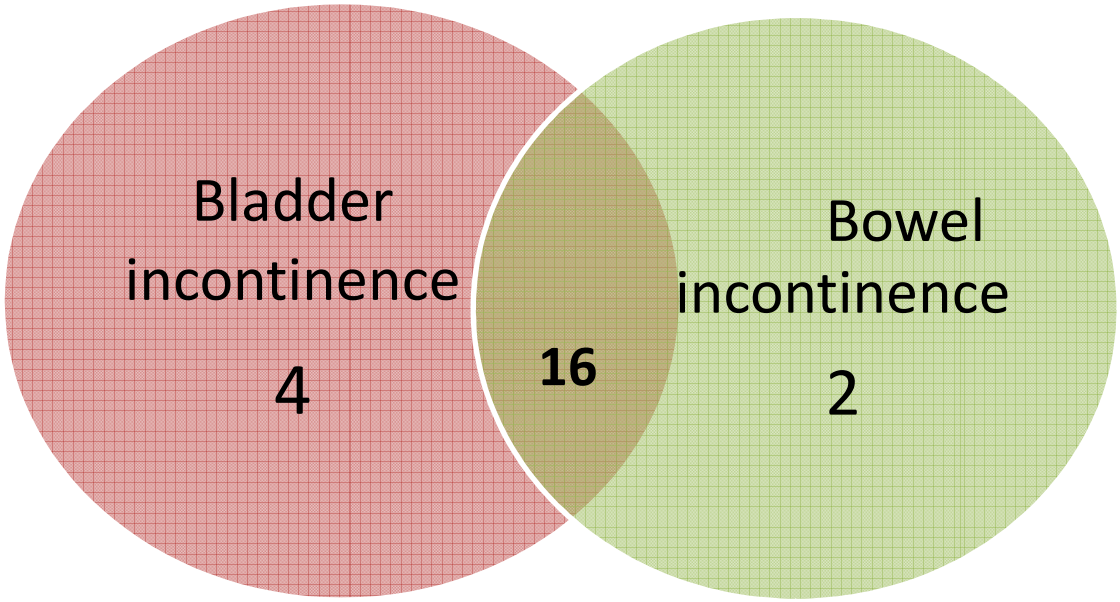


Fig. 5: Incontinence issues

Genitourinary system:

Urological evaluation was done in all 68 children. Back pressure changes as evidenced by hydronephrosis on an ultrasound or the presence of renal scars on a DMSA scintigraphy were documented. All 68 children underwent an ultrasound abdomen whereas 28 had a MCU and 17 had a DMSA scan none of whom were infants.

26 of the 68 children showed hydronephrosis on an ultrasound. Of these 26 children 21 had a MCU and 14 of them had a VUR and 8 of them were bilateral. 17 children had a DMSA scan and scars were seen in 5 of them. It was seen that 65.5% of children who were five years or more had upper tract dilatation and 17.95% of children who were less than five years had the same.

Renal involvement	No. of patients	Percentage
‹ 5 years	7 (n= 39)	17.95%
≥ 5 years	19 (n= 29)	65.50%

Table 2: Children with upper tract dilatation

Even though 65.5% of children who were five years or more had upper tract dilatation, the time at which they developed these changes would have been different. Keeping this in mind, the time at which each of the 26 children developed upper tract dilatation was obtained from the records. It was seen that 19 of the 26 children (73.07%) developed upper tract dilatation by the time they were five years old. There were 19 children who were infants at the time of evaluation and 4 of them [21.05%] had upper tract dilatation.

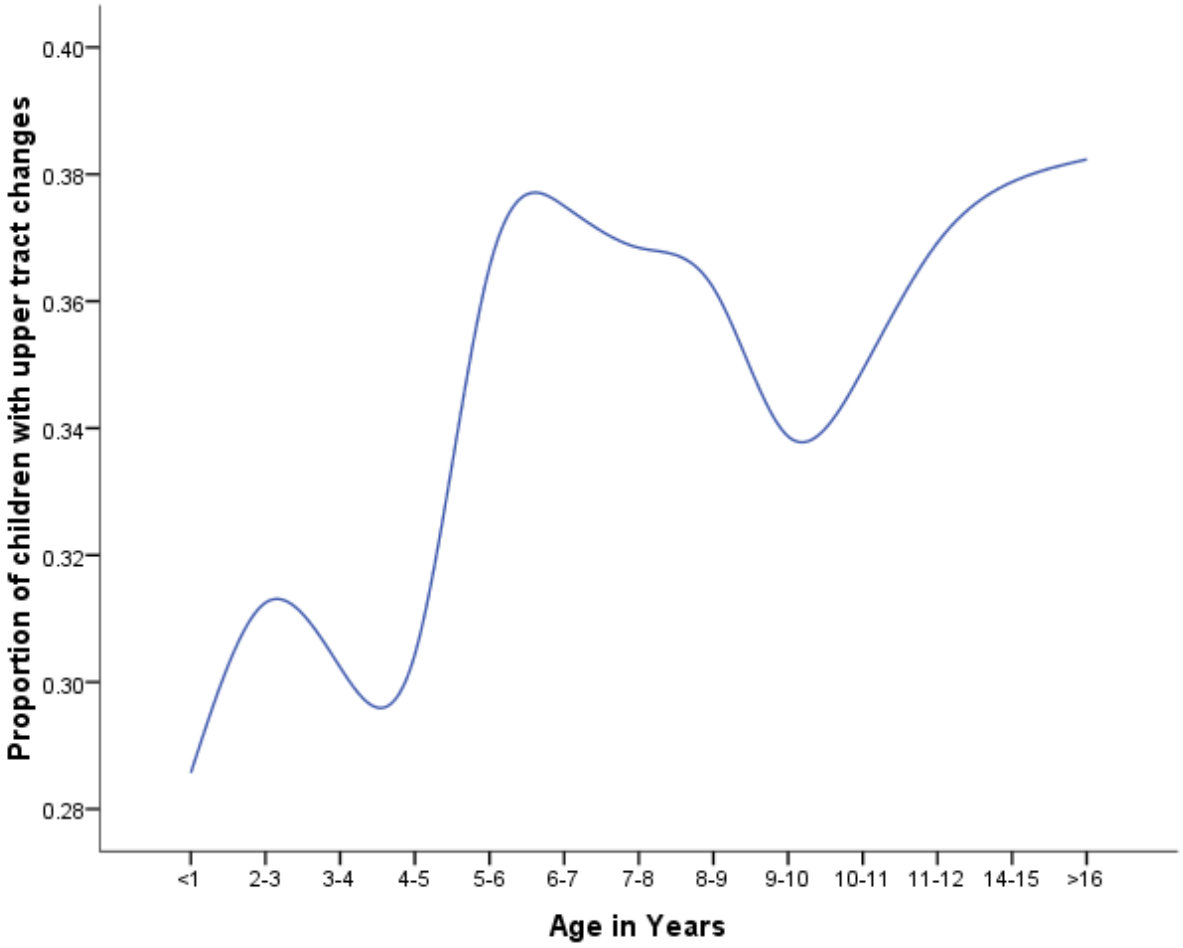


Fig. 6: Age wise proportion of children with upper tract dilatation.

Looking at presence of upper tract dilatation as the event of interest, an attempt was made to calculate the age at onset of developing upper tract changes. An 'Ogive' was plotted with the x axis showing the age in years at the time of development of upper tract dilatation and the y axis showing the proportion of children in each age group in our cohort that developed upper tract dilatation. The time at which the largest proportion of children developed these changes was at

5-6 years. Across the age groups the proportion of children developing upper tract dilatation seems to be uniform and ranges from 30-38%.

Very high bladder pressure is considered as the most important causative factor for upper tract deterioration and therapeutic measures are directed towards reducing bladder pressures. 42 of the total 68 children were either put on drugs or CIC or underwent diversion procedures or augmentation of the bladder (Illustration.8) to offset the upper tract changes that resulted from high bladder pressures. 26 children underwent clean intermittent catheterization (CIC) alone (Illustration.9), 20 children were put on bladder relaxing drugs like oxybutynin and amitriptyline, 16 children underwent bladder augmentation with CIC and 2 children underwent other diversion procedures like vesicostomy and ureterostomy.

Procedures	‹ 5 years (n= 39)	≥ 5 years (n= 29)
Bladder augmentation with CIC *	1	13
Vesicostomy	0	1
Ureterostomy	1	0
CIC alone +	13	13
Drugs with CIC	4	16

Table 3: Modes of bladder management

(*1 patient practicing urethral CIC; + 1 patient uses Mitrofanoff.)

Of the 14 children who had a bladder augmentation, an appendicular Mitrofanoff (Illustr.8) was used for bladder catheterization in 13 children while the urethra was used for bladder catheterization in 1 child. Of the 26 children who were put on CIC without augmentation, the urethra was used for catheterization in 25 while in one a Mitrofanoff was used.

28 children were not on CIC of which 14 were infants. 3 of these children inclusive of an infant had evidence of upper tract dilatation.

Gastrointestinal system:

A child is supposed to be potty trained by four years of age. The total number of children in this study who were more than four years old was 31. 12 children were continent to stools with 3 of them being on daily washes. 11 children had occasional soiling with 6 of them being on daily washes. 8 children had severe incontinence that interfered with activities of daily living and only 2 of them were on daily washes.

Musculoskeletal system:

Musculoskeletal problems like immobility, pressure sores and contractures were seen in 27 out of a total of 42 patients who were more than 2 years old (64.28%).

Mobility issues	2 to ‹ 5 years (n= 13)	≥ 5 years (n=29)
Not ambulant	9	7
Ambulant with AFO	0	2
Pressure sore	2	12
Contractures	1	5

Table 4: Locomotor problems

The sensory levels were tested in all 68 children. Touch and temperature sensation was checked in children who were more than 3 years old whereas pain was tested in children who were less than 3 year. It was seen that 73.53% of children had sensory deficits and 17.64% had pressure sores (Illustr.7). The results are summarized below.

Levels of sensation	No. of patients (n=68)
Fully sensate	18
L1 L2	15
L3 L4	12
L5 S1	23

Table 5: Levels of sensation

Central nervous system anomalies:

A total of 8 patients (11.76%), 5 in children who were five or more and 3 in children less than five years, were found to have symptomatic hydrocephalus which required shunting. 7 patients underwent a ventriculo-peritoneal shunt while one patient had endoscopic third ventriculostomy after a failed VP shunt.

Hydrocephalus	No. of patients	Percentage
‹ 5 years	3	7.69%
≥ 5 years	5	17.24%

Table 6: Children with hydrocephalus.

Associated anomalies:

Other associated anomalies were found in 20 of the 68 patients (29.41%).

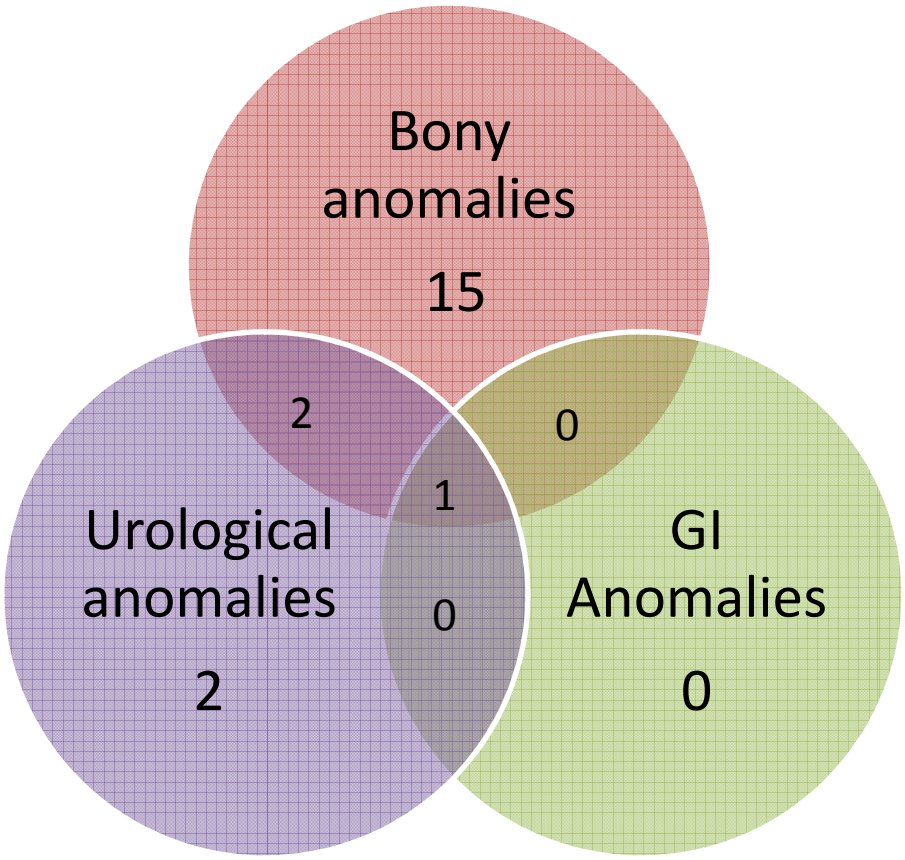


Fig. 7: Associated anomalies

Bony anomalies were seen in 18 patients (26.47%) and included developmental dysplasia of the hip (DDH), congenital talipes equino varus (CTEV), spinal anomalies like butterfly vertebra, partial sacral agenesis, fibular hemimelia and arthrogryphosis of the lower limb. (Illustration. 4, 5)

Bony anomalies	No. of patients
DDH	11
CTEV	10
Butterfly vertebra	2
Sacral agenesis	1
Arthrogryposis	1
Fibular hemimelia	1

Table 7 : Bony anomalies

Urological anomalies were seen in 5 patients and it included

Undescended testis in 2 patients

Solitary kidney in 1 patient

Crossed fused ectopic kidney in 1 patient

Hypospadias in 1 patient

Gastrointestinal anomaly seen in 1 patient was a high anorectal malformation.

Quality of life (QoL) measures:

The main contributors to the quality of life construct in children with spina bifida are thought to be incontinence, difficulty in ambulation and its resultant consequences. Since otherwise normal children become proficient in these domains by three to four years, the quality of life study was focused on children who were 5 years or more.

Quality of life in 29 children who were 5 years or more was assessed by sequentially administering the Barthel activities of daily living index; the PIN-Q for urinary incontinence related quality of life measure and a visual analogue score for general quality of life.

The Barthel activities of daily living index are a ten point assessment score with regards to activities of daily living. Scores of this index range from 0 to 20, with the best possible score being 20.

PIN-Q also called the paediatric incontinence quality of life score measures the quality of life with regards to urinary incontinence. There are 20 questions each having a score from 0 to 4. The maximum score is 80 and the minimum score is 0, with 0 being the best possible score.

Visual analogue scale measures the general quality of life with 0 being the least score and 100 being the best and the maximum possible score. This is the most easily administered, comprehended and validated global measure of quality of life.

A ‘patient generated index’ which was an open ended questionnaire was administered along with the above mentioned scales to measure the quality of life. Its purpose was to elicit issues affecting the quality of life that the patients’ care taker felt to be of importance and hitherto had

not been elicited. However there were difficulties in comprehending this instrument and therefore did not elicit an adequate response.

The values obtained were analyzed to see whether there was a significant association between the three instruments. The values were plotted in a scatter diagram and the significance was tested using the Pearson correlation coefficient.

		BARTHEL INDEX	PINQ	VAS
BARTHEL INDEX	Pearson Correlation	1	-.171	.646**
	Sig. (2-tailed)		.376	.000
	N	29	29	29
PINQ	Pearson Correlation	-.171	1	-.564**
	Sig. (2-tailed)	.376		.001
	N	29	29	29
VAS	Pearson Correlation	.646**	-.564**	1
	Sig. (2-tailed)	.000	.001	
	N	29	29	29

Table 8 :**. Correlation is significant at the 0.01 level (2-tailed).

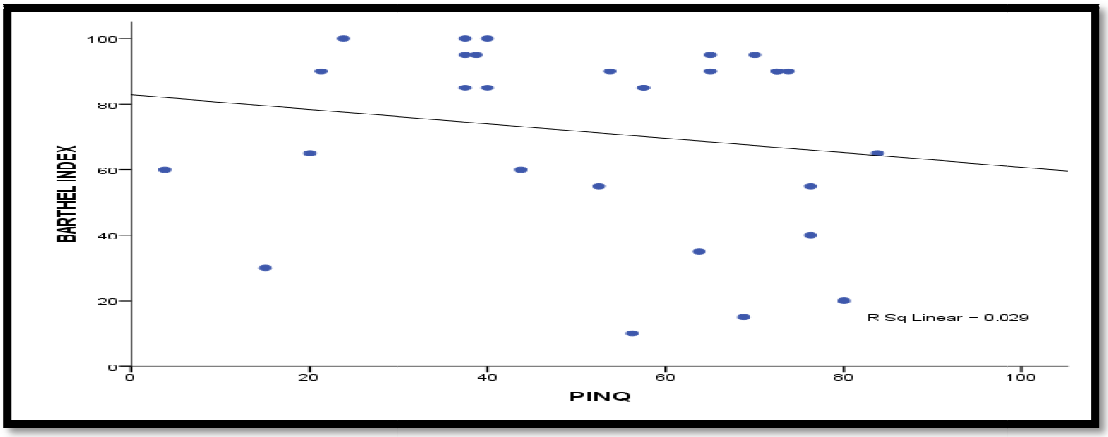


Fig. 8: PIN-Q V/s Barthel

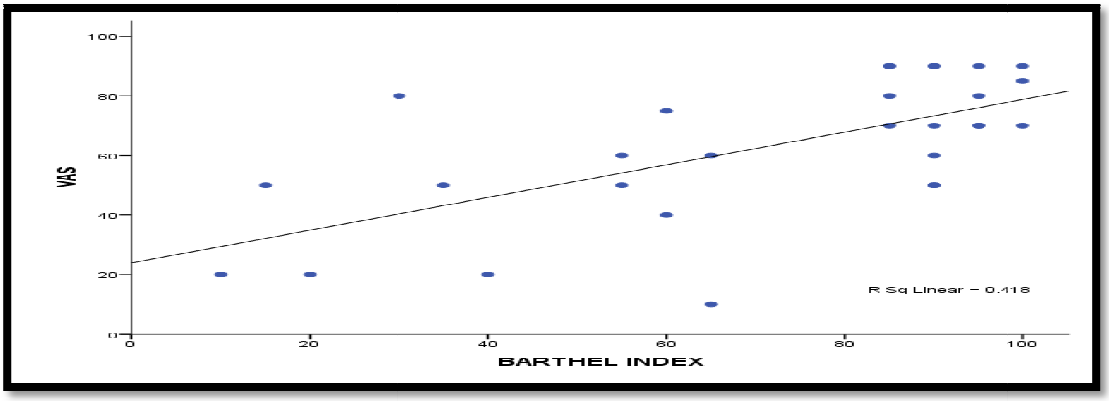


Fig. 9: Barthel V/s Visual analogue score

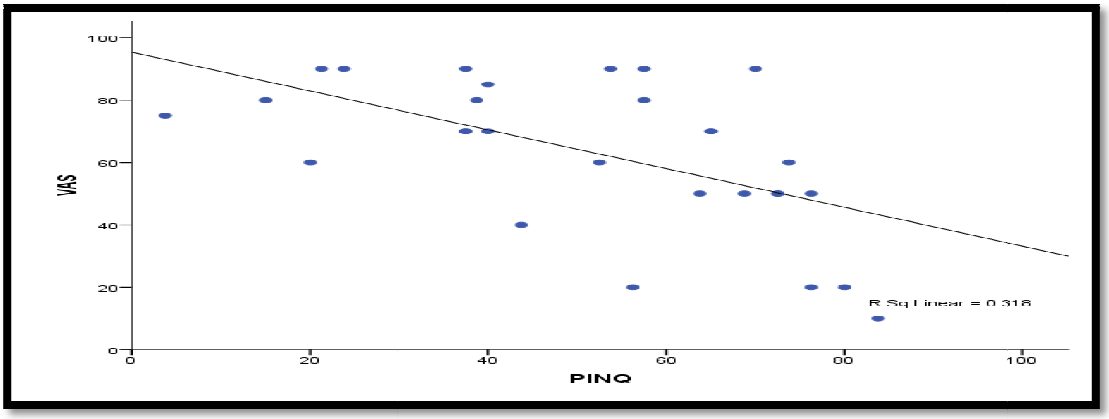


Fig. 10: PIN-Q V/s Visual analogue score

It was found that there was a statistically significant correlation for PIN-Q with visual analogue score and for Barthel index with visual analogue score. However a statistically significant correlation could not be obtained in PIN-Q with Barthel index, the reason probably being the lesser number of cases and the fact that Barthel evaluates more parameters, most of which do not relate to incontinence.

A prediction equation was also obtained between PINQ and visual analogue score

PINQ = 84.15-0.51(VAS)

The median and the quartiles values were calculated from the scores of PIN-Q, Barthels and Visual analogue score. The median and the quartile values for each of the indices are listed in table 9.

		VAS	BI Total	PINQ Total
N	Valid	29	29	29
	Missing	0	0	0
Percentiles	25	50.00	11.0000	30.0000
	50	70.00	17.0000	45.0000
	75	82.50	18.5000	57.0000

Table 9: Quartile values for each of the indices

The number of children in each quartile was then calculated for all the indices. It was presumed that the children whose scores were below the median value will have a poor quality of life. The median value for Visual analogue score was 70 out of a maximum of 100, Barthel was 17 out of 20 and PIN-Q score was 45 out of 80. The children whose scores were within the 25th centile were presumed to have an extremely poor quality of life, while those above the 75th centile were presumed to have a good quality of life.

According to the Barthel index and PIN-Q 8 of the 29 children (27.6%) were having an extremely poor quality of life while according to the Visual analogue score 10 of the 29 (34.5%) had the same. The children who had poor quality of life were seen to correlate across all quality of life instruments.

The quality of life scores were calculated in children who were 5 or more and having different co-morbidities. An attempt was made to see whether there was a change in the quality of life scores with increasing number of co-morbidities. The results obtained were not statistically significant.

Further an attempt was made to see whether there was a statistically significant correlation between PIN-Q and renal changes and whether higher score of PIN-Q corresponded with more renal changes. No statistically significant association was found between the two.

ILLUSTRATIONS

Illustration.1: Closed meningomyelocoele

Illustration.2: Open meningomyelocoele

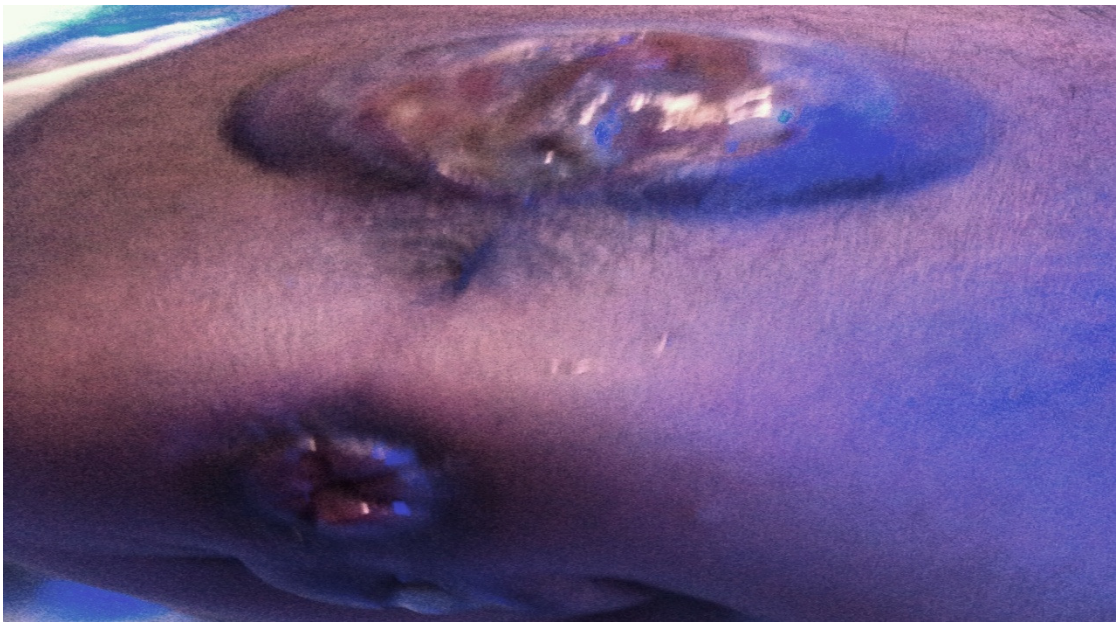


Illustration.3: Meningomyelocele with patulous anal opening

Illustration.4: CTEV in a child with Meningomyelocoele

Illustration.5: CTEV and DDH in a child with spina bifida aperta

Illustration.6: Post operative scar of MMC repair.

Illustration.7: Pressure sore

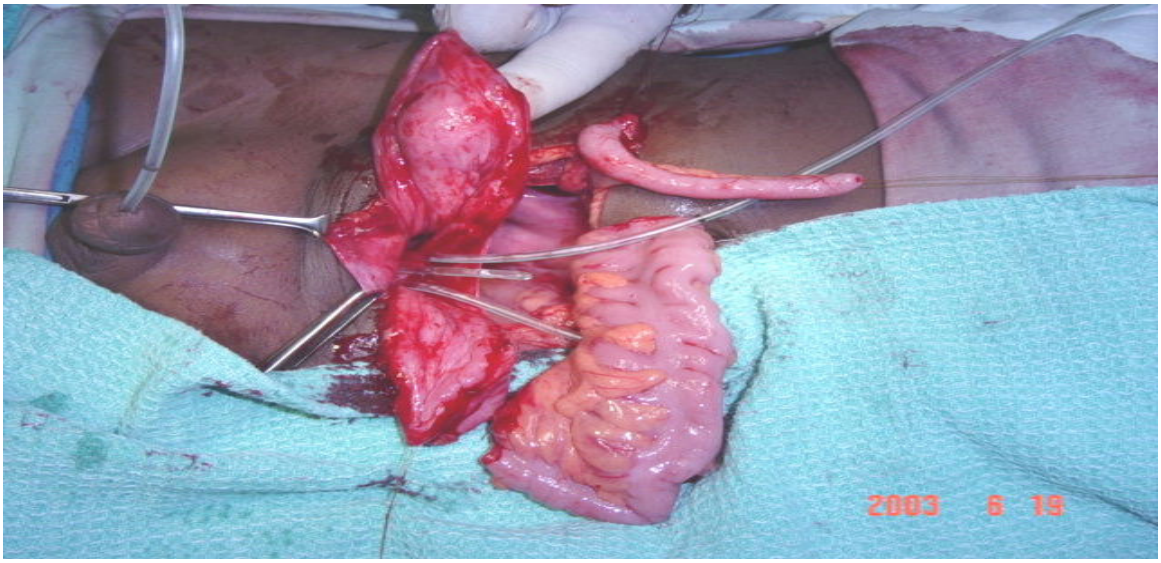


Illustration.8: Bladder augmentation using large intestine and appendix mobilized for Mitrofanoff.

Illustration.9: CIC through the Mitrofanoff

Case 1

8 year old boy presented with incontinence.

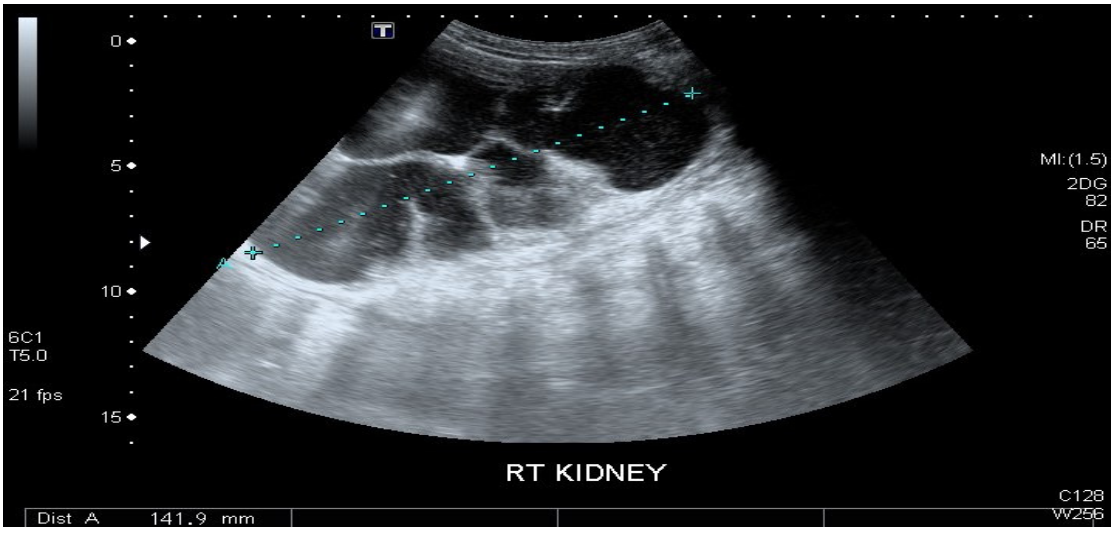


Illustration.10: Ultrasound showing right hydronephrosis

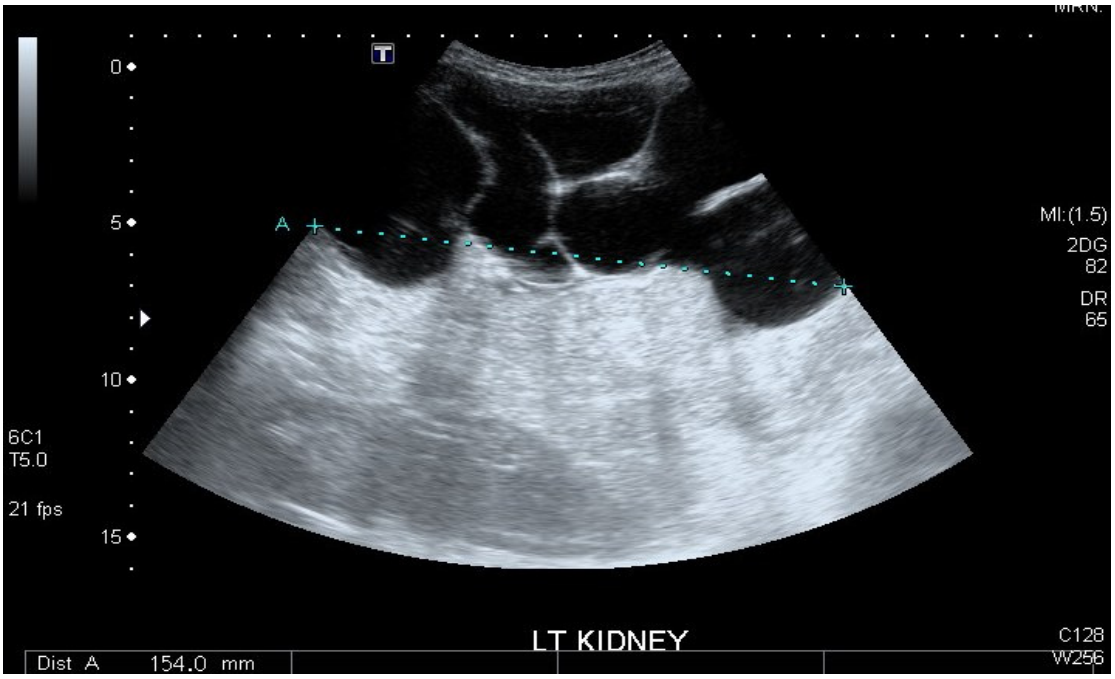


Illustration.11: Ultrasound showing left hydronephrosis

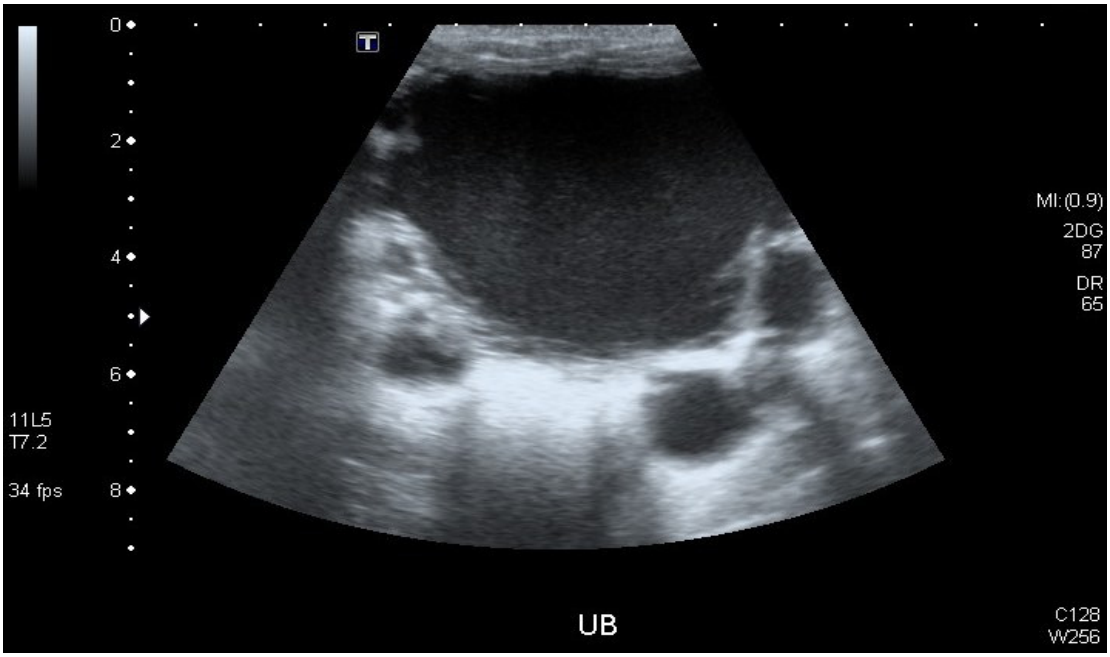


Illustration.12: Ultrasound showing irregular baldder with dilated terminal ureters

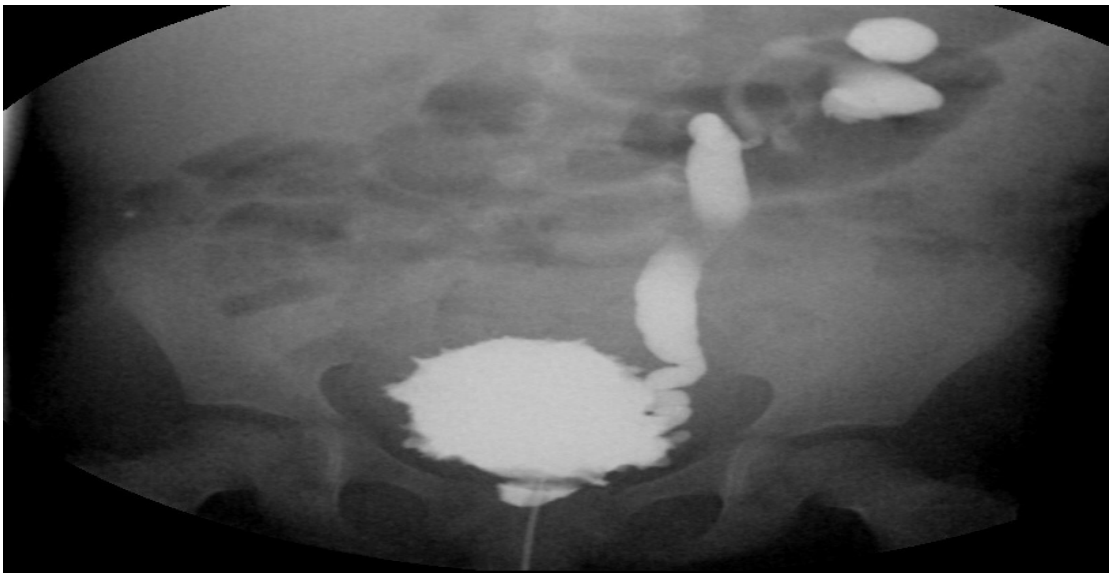


Illustration.13: MCU showing trabeculated bladder with open bladder neck and left VUR.

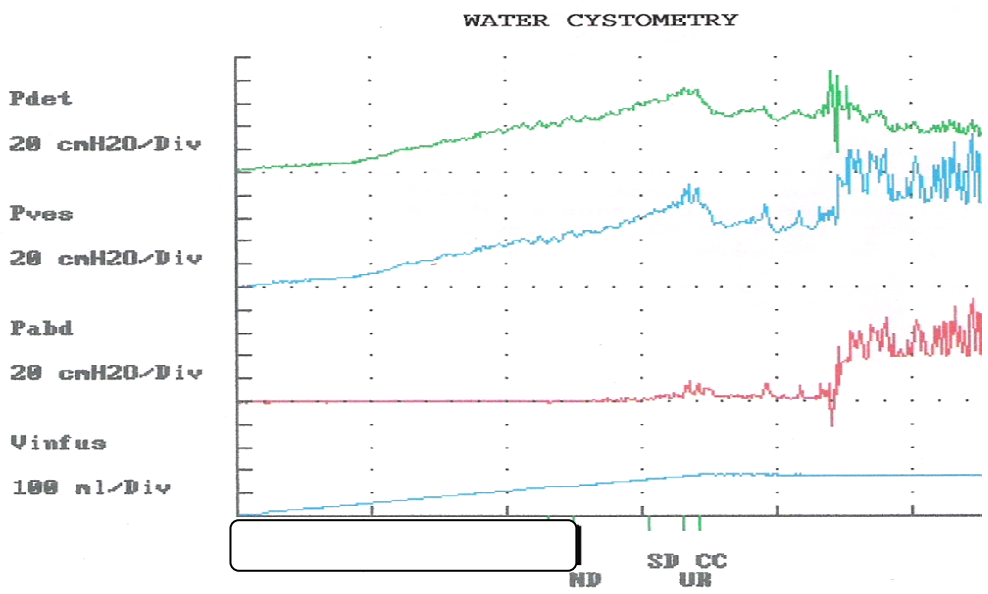


Illustration.14: CMG showing high pressure poorly compliant bladder.

The child underwent bladder augmentation with left ureteric reimplant and Mitrofanoff

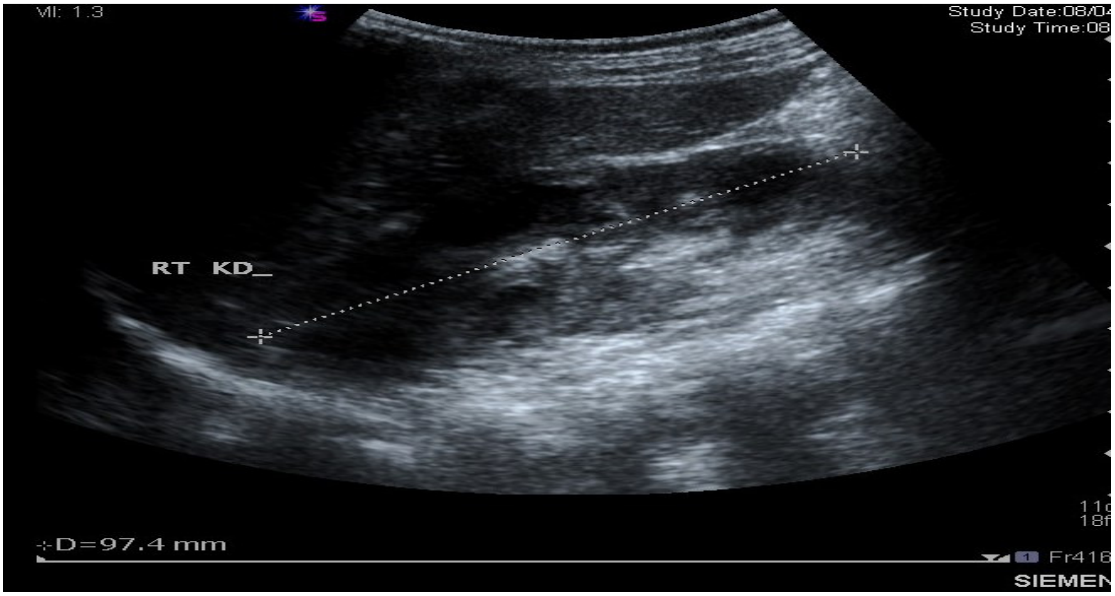


Illustration.15: Post augmentation ultrasound shows partial resolution of right hydroureteronephrosis.

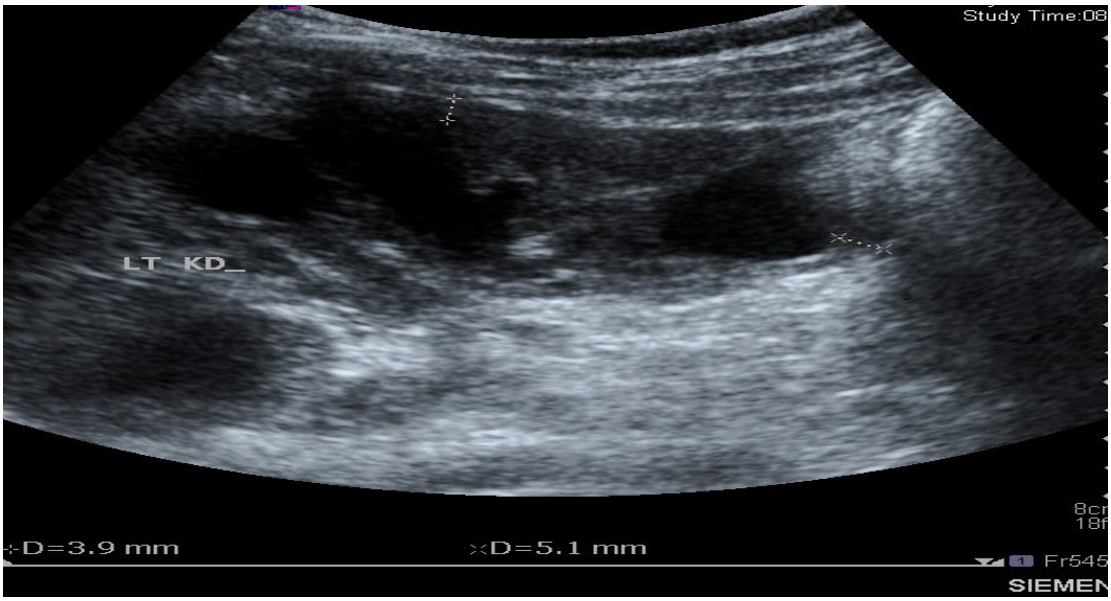


Illustration.16: Post augmentation ultrasound shows partial resolution of left hydroureteronephrosis.

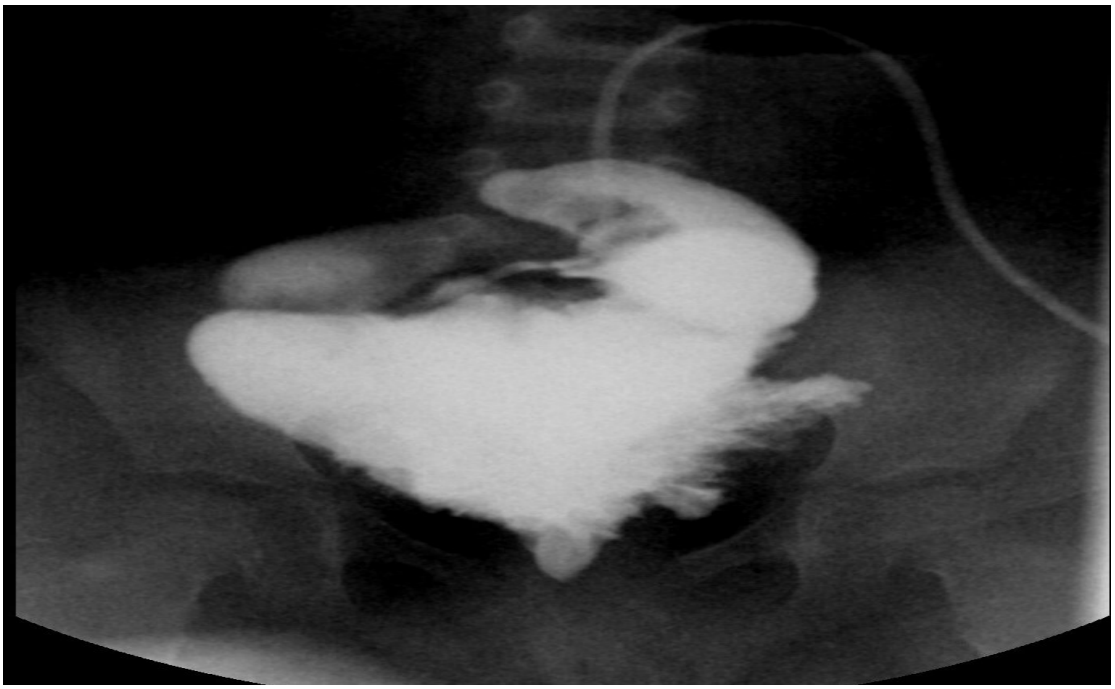


Illustration.17: MCU showing augmented bladder with resolution of VUR

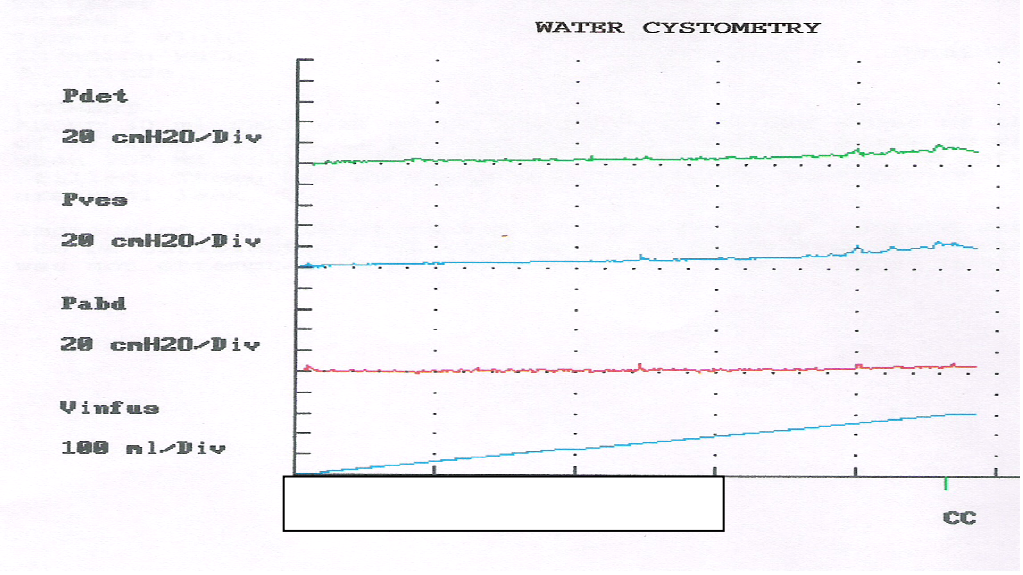


Illustration.18: Post operative CMG showing a compliant bladder.

Case 2:

A 13 year old girl who was not on CIC presented with UTI.

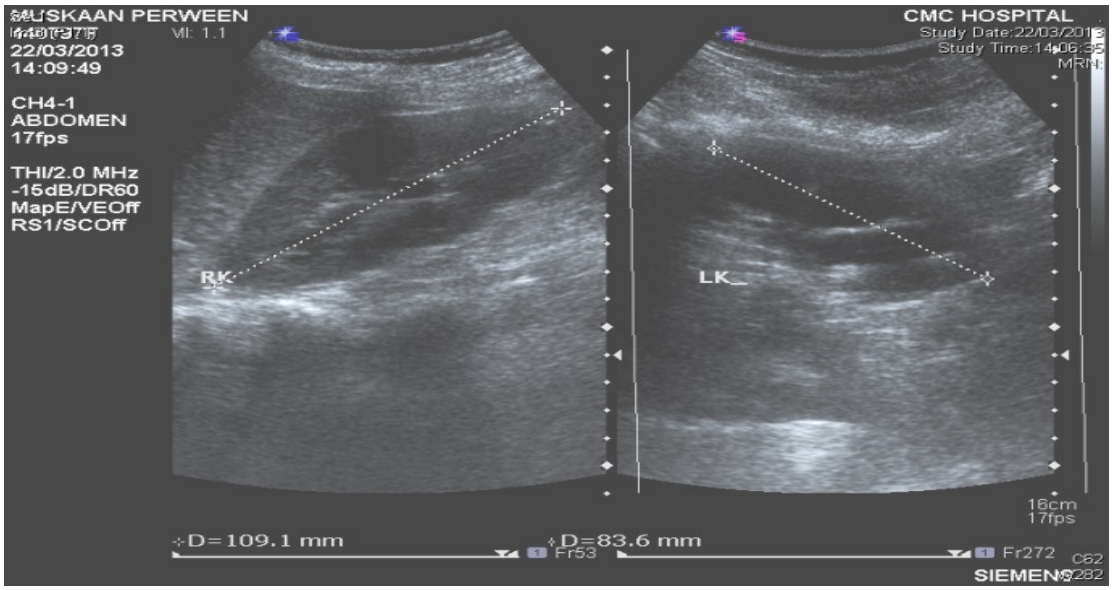


Illustration.19: USG showed bilateral hydronephrosis.

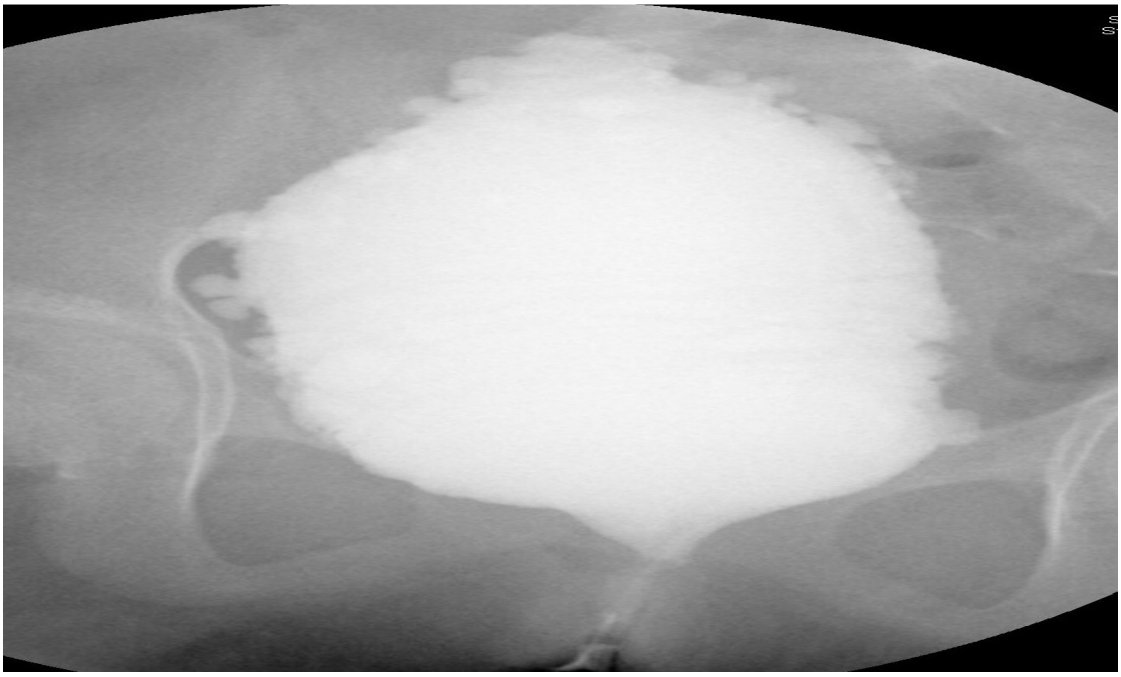


Illustration.20: MCU showing a trabeculated bladder with open bladder neck and no VUR.

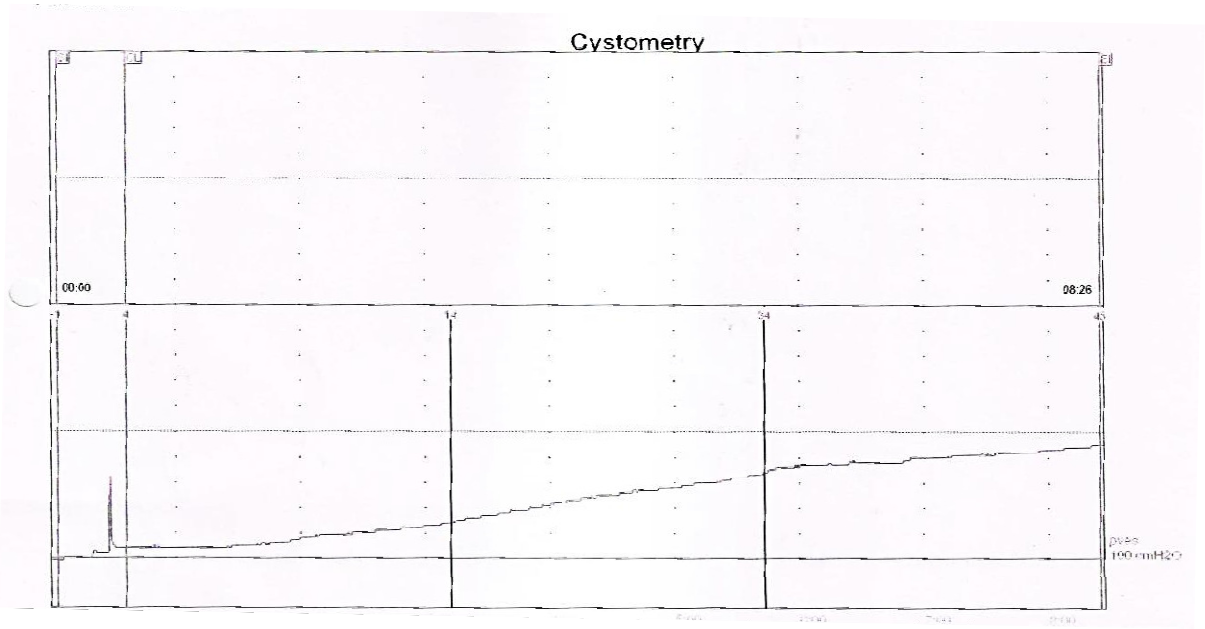


Illustration.21: CMG showed a high pressure poorly compliant bladder.

She was put on Oxybutynin with three hourly CIC and night drainage. She was told to review after 6 months and plan for augmentation if there was no improvement. Repeat USG showed resolution of hydronephrosis.

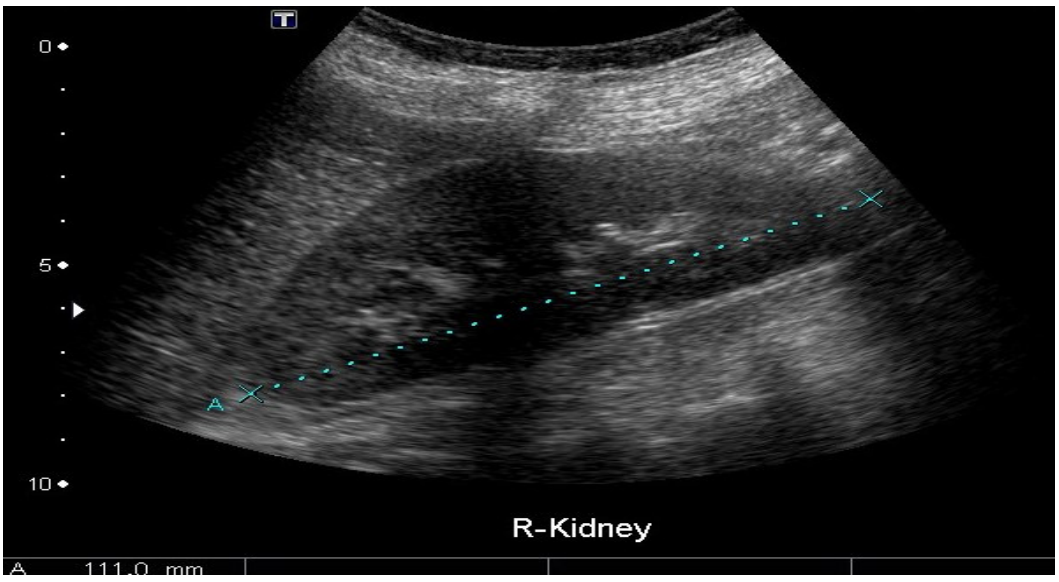


Illustration.22: Resolution of right hydronephrosis

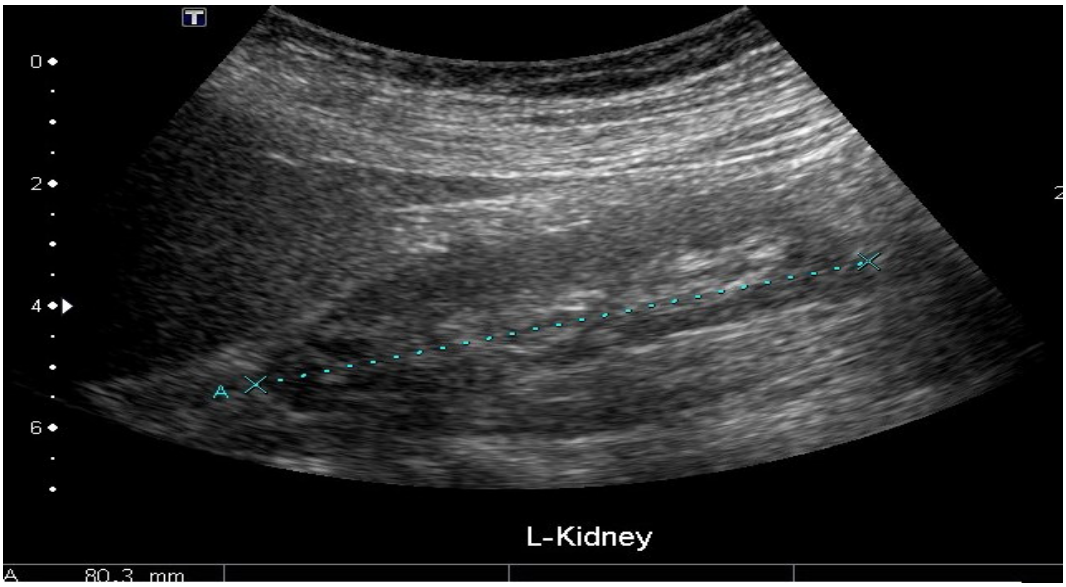


Illustration.23: Resolution of left hydronephrosis

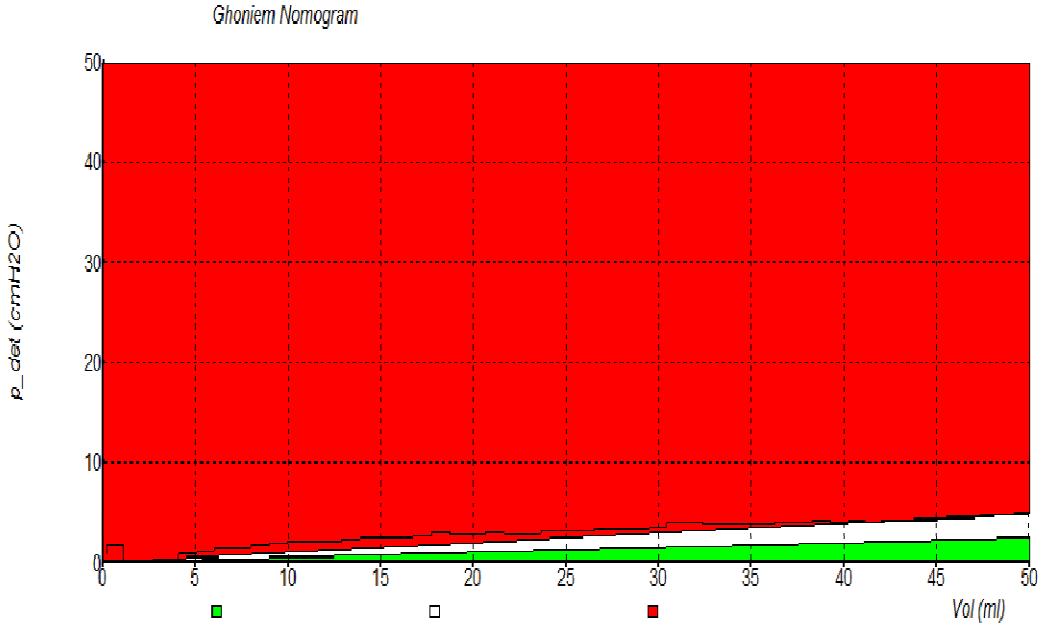


Illustration.24: Post CIC cystometrogram showed a compliant bladder

DISCUSSION

The outlook of spina bifida aperta has undergone a sea change over the past few decades. This condition had such poor prognosis in the 1960's that people refused to operate on such babies. However better understanding of this congenital condition, its complications along with improvement in medical and surgical techniques have resulted in successful management of this condition by a multi disciplinary approach. This change has been reflected in the improved survival rates of children with spina bifida aperta which has increased from 10% in the 1960's to about 85% at present (41).

General consideration: In our study, a total of 68 children with spina bifida aperta were evaluated. In this cohort, we encountered 19 infants during the period of study amounting to a calendar year. The children were further divided into two groups depending on whether their age was five years or more, or less than five years.

In our study, 43 of the 68 children were male [63.24%]. Mitchell et al in his study had observed that the incidence of spina bifida was higher in girls in the newborn period (7). Chopra et al gave a male female ratio of 1 to 1.3 (42).

The most common lesion in our study was a meningomyelocoele (88.23%) as it was in literature. The most common site of involvement of spina bifida aperta as per literature is the lumbar and sacral region at approximately 66-75% (43,44). In our study the commonly involved area was the lumbar spine at 46% followed by the lumbo sacral (L5S1 vertebra) and sacral spines at 25% each.

Genitourinary system: Scarring and renal failure is the most common cause of late death in patients with spina bifida aperta. The damage to the kidneys in these children may start as early as 6 months of age. The incidence of renal damage (scarring) in various studies has ranged from 4-36%. Lewis et al reported the overall prevalence of renal parenchymal damage in children with spina bifida as 19.4%. Another interesting observation made in the same study was that the prevalence of renal damage in children who were 10 years or more was 27.3% while the prevalence in those less than 5 years was only 13.3% (45). Kari et al reported renal scarring to be 36% at five years (46). The incidence of death due to renal damage in children with spina bifida aperta is around 20% (9,47).

In our study it was found that 26 out of 68 children [38.24%] had upper tract dilatation and the prevalence across age groups beyond infancy was ranging from 30-38%. There were 19 children who were one year or less at the time of evaluation and 4 of them [21.05%] had upper tract dilatation. The number of children who were 5 years or less at the time of evaluation was 43 and 12 of them [27.90%] had upper tract dilatation.

The time of development of upper tract dilatation for children who were beyond infancy was obtained from the records and we noticed that 2 out of 49 children (4.08%) developed upper tract dilatation by the age of one year. 15 of the 49 children [30.61%] developed upper tract dilatation by the time they were five years old. This was also comparable to the literature values. However a DMSA scan to document scarring was done only in 5 out of the 68, none of whom were infants.

The incidence of urinary incontinence in children with spina bifida aperta without intervention has varied from 46-80% as per different studies (26,48,49). In our study 20 out of the 29 children [68.96%] who were five years or more had urinary incontinence and only one child was able to void without accidents. This was found to be comparable with other studies given in literature.

Clean intermittent catheterization (CIC) in combination with anticholinergics like oxybutynin is the initial therapy in children with spina bifida associated neurogenic bladder and detrusor sphincter dyssynergia. It has been found that in the absence of treatment a large majority of children with detrusor sphincter dyssynergia will develop upper tract changes. The advantage of CIC is that it allows for complete bladder emptying thereby reducing the chance of infection and prevents high pressure voiding which is detrimental to kidney function. Oxybutynin relaxes the bladder preventing the high pressure bladder storage and high pressure detrusor contractions. Surgery is indicated in cases where CIC and drugs were found to be ineffective.

Of the 26 patients who were on CIC without augmentation of the bladder, 25 used the urethra for catheterization while a Mitrofanoff was employed in a female who found it difficult to catheterize per urethrally.

14 patients were on CIC in association with bladder augmentation. 13 of the 14 patients performed CIC through an appendicular Mitrofanoff while the remaining 1 patient used the urethra.

Malone et al in their study noted that the incidence of urinary diversion procedures like ureterostomy, vesicostomy and bladder augmentation, done in cases of spina bifida associated

neurogenic bladder was 26% (49). In our study diversion procedures were needed in 14 out of 68 patients [23.52%] and it was found to be comparable to other studies.

Gastrointestinal system: The incidence of bowel incontinence in children with spina bifida aperta varies from 13-71% according to different studies (26,27). In our study 18 of the 29 children [62.06%] who were five years or more and 19 of the 31 children [61.29%] who were four years or more had soiling/ bowel incontinence. 11 of the 31 children [35.48%] who were 4 years or more were on bowel washes. 8 of these 11 children [72.7%] who were on bowel wash programme had soiling or accidents. This value also concurred with the literature.

Central nervous system: The rates of meningomyelocoele associated hydrocephalus in literature are extremely high at 80% (50). It is also stated that the majority of children requiring shunt surgery will do so by five months of age (8). In our study the total number of patients with symptomatic hydrocephalus that required shunting was 8 [11.76%]. Such wide discrepancy in the incidence rates of hydrocephalus in Indian population as compared to the West is surprising and needs to be investigated. The incidence of mental retardation in literature is around 20% (51,52), however we could not find any case of mental retardation in our study cohort.

Musculoskeletal system: Singh et al reported the incidence of locomotory problems as 55% with 62% of them being independent with aids (53). In our study musculoskeletal problems like immobility, pressure sores and contractures were seen in 27 of the 42 children [64.28%] who were more than two years old. 26 children [61.90%] of this group was independent (2 of them used AFO's). This almost concurred with the values in literature.

Sandler in his 2010 study reported the incidence of CTEV in children with spina bifida aperta as 50% and DDH as 25-50% (54). In our study 10 of the 68 children [14.70%] had CTEV and 11 children had DDH [16.17%]. These values were substantially lesser on comparing with International standards. The most common spinal anomaly excluding kyphoscoliosis is a hemivertebra as per literature (55).

Quality of life (QoL) measures: The quality of life in children who were five years or more was studied. As the model of QoL was believed to be mainly related to continence, it was decided to administer the QoL instruments to children who were more than 5 years. Four instruments namely the Barthel activities of daily living index, PIN-Q to measure the urinary incontinence related quality of life, a visual analogue scale (VAS) to measure the general quality of life and a patient generated index were used. The concept of a patient generated index proved to be too complex for our cohort and hence was not used.

It was seen that 8 out of the 29 children had a poor quality of life across all three instruments. The factors which correlated to a poor quality of life in these children were bladder and bowel incontinence and immobility.

On comparing the QoL scores obtained on all three instruments (PIN-Q, Barthel,VAS) for children with incontinence and mobility problems versus children with only incontinence, the median QoL scores obtained in the Barthel and VAS were better for those with incontinence alone (18 and 70 respectively) as opposed to those with incontinence and mobility problems (11 and 50 respectively). This trend seems to support the construct that incontinence and mobility problems contribute to QoL. The QoL that was estimated by PIN-Q was found to be

almost similar (52 in incontinence alone and 55 in patients with incontinence and mobility issues) in the two groups. However the association that QoL scores decrease as co-morbidities increase was not found to be statistically significant.

Further an attempt was made to see whether there was a statistically significant correlation between PIN-Q and renal changes and whether higher score of PIN-Q corresponded with renal dilatation. No statistically significant association was found between the two.

The results concurred with known international standards in almost all areas except for the reduced incidence of symptomatic hydrocephalus and associated anomalies like CTEV and DDH. Comparison with other Indian studies was not possible as studies from our country on spina bifida aperta have been few. Further studies will be required to authenticate this finding and search for any reason why this may be true for children from the Indian sub-continent.

CONCLUSION

This cross sectional study revealed in our cohort that meningomyelocoele was the commonest spina bifida aperta lesion and it mostly affected the lumbar and sacral regions.

The prevalence rate of upper tract dilatation in our cohort was 38.24%. The prevalence rate of upper tract dilatation in infants was 21.05% and in children who were 5 years or less was 27.90%.

The time of development of upper tract dilatation in the rest of the children who were not infants at the time of evaluation was noted. 4.08% of children developed upper tract dilatation by the age of one year and 30.61% developed upper tract dilatation by the time they were five years old. Upper tract dilatation needs to be further evaluated by MCU and EMG to identify patients at risk.

The prevalence of various morbidities was as follows: urinary incontinence in children who were 5 years or more was 68.9%. Bowel incontinence in children who were 4 years or more was 61.29%. 55.17% of children who were 5 years or more had both bowel and bladder incontinence. Ambulatory problems in children who were 2 years or more were 38.09%. The prevalence rate of hydrocephalus in the entire cohort of 68 patients was 11.76% which was distinctly different from western studies. None had mental retardation.

58.82% of children from the entire cohort were on CIC with majority using a Mitrofanoff. Timed double voiding was done by one child. 35.48% of children who were 4 years or more

were on bowel washes. 72.7% of children who were on bowel wash programme had soiling or accidents leaving much to be desired of this.

Health related quality of life was evaluated in children with spina bifida aperta who were five years or more. Of all the quality of life instruments the visual analogue score was the most easily administrable and the most easily comprehensible score. Despite 81% of children having incontinence and 55% of children having mobility issues their global QoL as measured by the median visual analogue score was 70.

It was found that 8 of the 29 children (27.6%) had a very poor quality of life which corresponded to the 25^{th} centile of the scores and it correlated with them having urinary incontinence, fecal incontinence and immobility. A good quality of life which corresponded to the 75^{th} centile was seen in 7 of the 29 (24.1%) children. Further measures to improve the quality of life are the need of the hour in such children.

Limitation of the study:

The major limitation of this study was that a patient perspective of issues contributing to the quality of life could not be obtained. It calls for a better instrument to measure the quality of life in children with spina bifida aperta.

Compliance with bladder and bowel management was self reported and could not be verified by a neutral third party observer.

Upper tract dilatation as evidenced by ultrasound is a crude measure of renal damage. A DMSA scan which gives an accurate measure of renal damage was done only in 25% of the total cohort.

Scope for further research: This study opens out further possibilities for research namely:

- To develop a better open ended instrument to study the quality of life.
- A larger study to correlate quality of life scores with clinical outcomes.
- A study in which DMSA scan is done in all patients to look for renal scarring.
- To develop a better bowel management program.

BIBLIOGRAPHY

1. Smith GK. The history of spina bifida, hydrocephalus, paraplegia, and incontinence. Pediatr Surg Int. 2001 Jul 1;17(5-6):424–32.

2. Venkataramana NK. Spinal dysraphism. J Pediatr Neurosci. 2011 Oct;6(Suppl1):S31–S40.

3. Cherian A, Seena S, Bullock RK, Antony AC. Incidence of neural tube defects in the least-developed area of India: a population-based study. Lancet. 2005 Sep 10;366(9489):930–1.

4. Clemmensen D, Thygesen M, Rasmussen MM, Fenger-Grøn M, Petersen OB, Mosdal C. Decreased incidence of myelomeningocele at birth: effect of folic acid recommendations or prenatal diagnostics? Childs Nerv Syst ChNS Off J Int Soc Pediatr Neurosurg. 2011 Nov;27(11):1951–5.

5. Botto LD, Moore CA, Khoury MJ, Erickson JD. Neural-Tube Defects. N Engl J Med. 1999;341(20):1509–19.

6. Blatter BM, Roeleveld N, Zielhuis GA, Gabreëls FJ, Verbeek AL. Maternal occupational exposure during pregnancy and the risk of spina bifida. Occup Environ Med. 1996 Feb 1;53(2):80–6.

7. Mitchell LE, Adzick NS, Melchionne J, Pasquariello PS, Sutton LN, Whitehead AS. Spina bifida. The Lancet. 2004 Nov 26;364(9448):1885–95.

8. Stapleton S. Spinal Dysraphism. In: FRCS AJMMB BSc, Newell DW, editors. Neurosurgery [Internet]. Springer London; 2005 [cited 2014 Mar 10]. p. 475–87. Available from: http://link.springer.com/chapter/10.1007/1-84628-051-6_27

9. Gool JD van, Dik P, Jong TPVM de. Bladder-sphincter dysfunction in myelomeningocele. Eur J Pediatr. 2001 Jul 1;160(7):414–20.

10. Bauer SB, Joseph DB. Management of the obstructed urinary tract associated with neurogenic bladder dysfunction. Urol Clin North Am. 1990 May;17(2):395–406.

11. Bauer S. Neurogenic voiding dysfunction and non-surgical management. The Kelalis-King-Belman Textbook of Clinical Paediatric Urology [Internet]. 2007th ed. Informa Healthcare; [cited 2014 Mar 10]. p. 782–3. Available from: http://informahealthcare.com/doi/abs/10.3109/9780203003145.053

12. Snodgrass WT, Adams R. Initial urologic management of myelomeningocele. Urol Clin North Am. 2004 Aug;31(3):427–34.

13. Tarcan T, Bauer S, Olmedo E, Khoshbin S, Kelly M, Darbey M. Long-term followup of newborns with myelodysplasia and normal urodynamic findings: Is followup necessary? J Urol. 2001 Feb;165(2):564–7.

14. Baskin LS, Kogan BA, Benard F. Treatment of Infants with Neurogenic Bladder Dysfunction using Anticholinergic Drugs and Intermittent Catheterisation. Br J Urol. 1990;66(5):532–4.

15. Lapides J, Diokno AC, Silber SM, Lowe BS. Clean, intermittent self-catheterization in the treatment of urinary tract disease. 1972. J Urol. 2002 Apr;167(4):1584–6.

16. Woodhouse CRJ. Myelomeningocele in young adults. BJU Int. 2005;95(2):223–30.

17. Andersson KE, Chapple CR. Oxybutynin and the overactive bladder. World J Urol. 2001 Nov 1;19(5):319–23.

18. Kaefer M, Pabby A, Kelly M, Darbey M, Bauer SB. Improved bladder function after prophylactic treatment of the high risk neurogenic bladder in newborns with myelomentingocele. J Urol. 1999 Sep;162(3 Pt 2):1068–71.

19. Brendler CB, Radebaugh LC, Mohler JL. Topical oxybutynin chloride for relaxation of dysfunctional bladders. J Urol. 141(6):1350–2.

20. Buyse G, Verpoorten C, Vereecken R, Casaer P. Intravesical application of a stable oxybutynin solution improves therapeutic compliance and acceptance in children with neurogenic bladder dysfunction. J Urol. 1998 Sep;160(3 Pt 2):1084–1087; discussion 1092.

21. Buyse G, Waldeck K, Verpoorten C, Björk H, Casaer P, Andersson KE. Intravesical oxybutynin for neurogenic bladder dysfunction: less systemic side effects due to reduced first pass metabolism. J Urol. 1998 Sep;160(3 Pt 1):892–6.

22. Aslan AR, Kogan BA. Conservative management in neurogenic bladder dysfunction: Curr Opin Urol. 2002 Nov;12(6):473–7.

23. Agarwal SK, Bagli DJ. Neurogenic bladder. Indian J Pediatr. 1997 May 1;64(3):313–26.

24. Sidi AA, Aliabadi H, Gonzalez R. Enterocystoplasty in the management and reconstruction of the pediatric neurogenic bladder. J Pediatr Surg. 1987 Feb;22(2):153–7.

25. Husmann DA, Rathbun SR. Long-term follow up of enteric bladder augmentations: The risk for malignancy. J Pediatr Urol. 2008 Oct;4(5):381–5.

26. Verhoef M, Lurvink M, Barf HA, Post MWM, van Asbeck FWA, Gooskens RHJM, et al. High prevalence of incontinence among young adults with spina bifida: description, prediction and problem perception. Spinal Cord. 2005 Feb 1;43(6):331–40.

27. Krogh K, Lie HR, Bilenberg N, Laurberg S. Bowel function in Danish children with myelomeningocele. APMIS Suppl. 2003;(109):81–5.

28. Hensle TW, Reiley EA, Chang DT. The Malone Antegrade Continence Enema Procedure in the Management of Patients with Spina Bifida. J Am Coll Surg. 1998 Jun;186(6):669–74.

29. Chait PG, Shlomovitz E, Connolly BL, Temple MJ, Restrepo R, Amaral JG, et al. Percutaneous Cecostomy: Updates in Technique and Patient Care. Radiology. 2003 Apr 1;227(1):246–50.

30. Verhoef M, Barf H, Post MWM, van Asbeck FWA, Gooskens RHJM, Prevo AJH. Secondary impairments in young adults with spina bifida. Dev Med Child Neurol. 2004;46(6):420–7.

31. Carr TL. The Orthopaedic Aspects of One Hundred Cases of Spina Bifida. Postgrad Med J. 1956 Apr 1;32(366):201–10.

32. Werhagen L, Gabrielsson H, Westgren N, Borg K. Medical complication in adults with spina bifida. Clin Neurol Neurosurg. 2013 Aug;115(8):1226–9.

33. Elgamal EA. Natural history of hydrocephalus in children with spinal open neural tube defect. Surg Neurol Int. 2012;3:112.

34. Kumar R, Singh SN. Spinal Dysraphism: Trends in Northern India. Pediatr Neurosurg. 2003;38(3):133–45.

35. Geerdink N, Cuppen I, Rotteveel J, Mullaart R, Roeleveld N, Pasman J. Contribution of the Corticospinal Tract to Motor Impairment in Spina Bifida. Pediatr Neurol. 2012 Oct;47(4):270–8.

36. Sumpter R, Dorris L, Brannan G, Carachi R. Quality of life and behavioural adjustment in childhood hydrocephalus. Scott Med J. 2012 Feb 1;57(1):18–25.

37. De Jong TP, Boemers TM, Schouten A, van Gool JD, de Maat-Bleeker F, Bruijnzeel-Koomen CA. [Peroperative anaphylactic reactions due to latex allergy]. Ned Tijdschr Geneeskd. 1993 Sep 18;137(38):1934–6.

38. Prevention of neural tube defects: results of the Medical Research Council Vitamin Study. MRC Vitamin Study Research Group. Lancet. 1991 Jul 20;338(8760):131–7.

39. Czeizel A, Dudas I. Prevention to the first occurence of neural-tube defects by periconceptional vitamin supplementation. N Engl J Med. 327(26):1832–5.

40. Daly S, Mills JL, Molloy AM, Conley M, Lee YJ, Kirke PN, et al. Minimum effective dose of folic acid for food fortification to prevent neural-tube defects. The Lancet. 1997 Dec 6;350(9092):1666–9.

41. Bomalaski MD, Teague JL, Brooks B. The Long-Term Impact of Urological Management on the Quality of Life of Children with Spina Bifida. J Urol. 1995 Aug;154(2):778–81.

42. Chopra S, Gulati MS, Paul SB, Hatimota P, Jain R, Sawhney S. MR spectrum in spinal dysraphism. Eur Radiol. 2001 Feb 1;11(3):497–505.

43. Clayton DB, Brock JW, Joseph DB. Urologic management of spina bifida. Dev Disabil Res Rev. 2010;16(1):88–95.

44. Swank M, Dias L. Myelomeningocele: a review of the orthopaedic aspects of 206 patients treated from birth with no selection criteria. Dev Med Child Neurol. 1992 Dec;34(12):1047–52.

45. Lewis MA, Webb NJ, Stellman-Ward GR, Bannister CM. Investigative techniques and renal parenchymal damage in children with spina bifida. Eur J Pediatr Surg Off J Austrian Assoc Pediatr Surg Al Z Für Kinderchir. 1994 Dec;4 Suppl 1:29–31.

46. Kari JA, Safdar O, Jamjoom R, Anshasi W. Renal involvement in children with spina bifida. Saudi J Kidney Dis Transplant Off Publ Saudi Cent Organ Transplant Saudi Arab. 2009 Jan;20(1):102–5.

47. Jong TPVM de, Chrzan R, Klijn AJ, Dik P. Treatment of the neurogenic bladder in spina bifida. Pediatr Nephrol. 2008 Jun 1;23(6):889–96.

48. Lie HR, Lagergren J, Rasmussen F, Lagerkvist B, Hagelsteen J, Börjeson M-C, et al. Bowel and Bladder Control of Children with Myelomeningocele: A Nordic Study. Dev Med Child Neurol. 1991;33(12):1053–61.

49. Malone PS, Wheeler RA, Williams JE. Continence in patients with spina bifida: long term results. Arch Dis Child. 1994 Feb 1;70(2):107–10.

50. Dias MS, McLone DG. Hydrocephalus in the child with dysraphism. Neurosurg Clin N Am. 1993 Oct;4(4):715–26.

51. Oakeshott P, Hunt GM. Long-term outcome in open spina bifida. Br J Gen Pract. 2003 Aug;53(493):632–6.

52. Adzick NS. Fetal myelomeningocele: natural history, pathophysiology, and in-utero intervention. Semin Fetal Neonatal Med. 2010 Feb;15(1):9–14.

53. Singh U, Gogia VS. Rehabilitation of patients with spina bifida. Indian J Pediatr. 1997 Dec;64(6 Suppl):77–82.

54. Sandler AD. Children with Spina Bifida: Key Clinical Issues. Pediatr Clin North Am. 2010 Aug;57(4):879–92.

55. MemetÖzek M, Belirgen M. Vertebral Anomalies and Spinal Malformations in Myelomeningocele. The Spina Bifida [Internet]. Springer Milan; 2008 [cited 2014 Mar 17]. p. 185–96. Available from: http://link.springer.com/chapter/10.1007/978-88-470-0651-5_14

.

Appendix

INSTITUTIONAL REVIEW BOARD (IRB)
CHRISTIAN MEDICAL COLLEGE
VELLORE 632 002, INDIA

Dr. B J Prashantham, M.A, M. A., Dr. Min (Clinical)
Director, Christian Counselling Centre
Chairperson, Ethics Committee

Dr. Alfred Job Daniel, D Ortho MS Ortho DNB Ortho
Chairperson, Research Committee & Principal

Dr. Nihal Thomas
MD,MNAMS, DNB(Endo), FRACP(Endo), FRCP(Edin)
Secretary, Ethics Committee, IRB
Additional Vice Principal (Research)

February 13, 2013

Dr. Jujju Jacob Kurian
Senior Registrar
Department of Paediatric Surgery
Christian Medical College
Vellore 632 002

Sub: **FLUID Research grant project NEW PROPOSAL:**
Predictors of morbidity and health related quality of life in children with spina bifida aperta.
Dr. Jujju Jacob Kurian, Senior Registrar, Paediatric Surgery, Dr. John Mathai, Paediatric Surgery, Mr. Sanjeev Padankatti, Occupational therapy services

Ref: IRB Min. No. 8114 dated 05.12.2012

Dear Dr. Jujju Jacob Kurian,

I enclose the following documents:-

1. Institutional Review Board approval
2. Agreement

Could you please sign the agreement and send it to Dr. Nihal Thomas, Addl. Vice Principal (Research), so that the grant money can be released.

With best wishes,

Dr. Nihal Thomas
Secretary (Ethics Committee)
Institutional Review Board

Dr Nihal Thomas
MBBS MD MNAMS DN3 (Endo) FRACP(Endo) FRCP(Edin)
Secretary (Ethics Committee)
Institutional Review Board

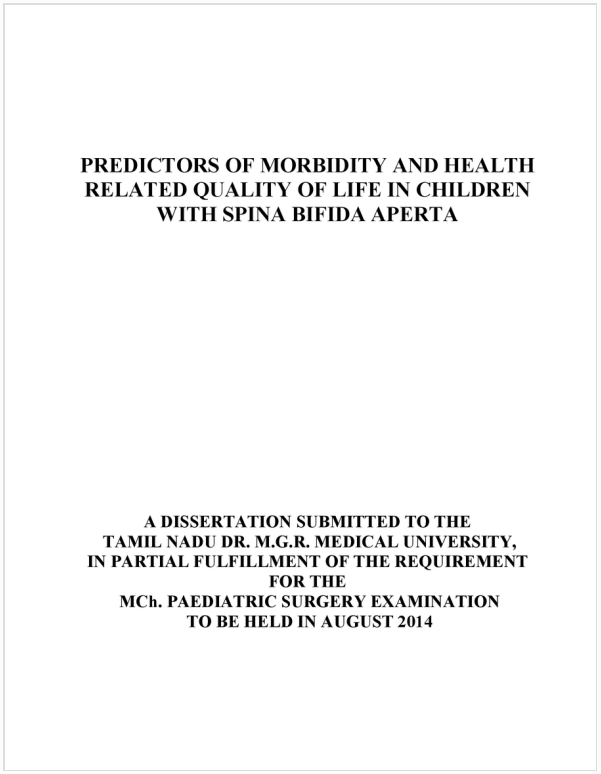
CC: Dr. John Mathai, Department of Paediatric Surgery

Digital Receipt

This receipt acknowledges that Turnitin received your paper. Below you will find the receipt information regarding your submission.

The first page of your submissions is displayed below.

Submission author:	18113302 . M.ch. Paediatric Surgery JUJJU JACOB KURIAN . KURIANCPHILIP
Assignment title:	Medical
Submission title:	Predictors of morbidity and health related quality of life in spina bifida
File name:	THESIS.docx
File size:	39.18K
Page count:	66
Word count:	10,484
Character count:	56,651
Submission date:	26-Mar-2014 02:00AM
Submission ID:	404518953



PREDICTORS OF MORBIDITY AND HEALTH RELATED QUALITY OF LIFE IN CHILDREN WITH SPINA BIFIDA APERTA

A DISSERTATION SUBMITTED TO THE
TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY,
IN PARTIAL FULFILLMENT OF THE REQUIREMENT
FOR THE
MCh. PAEDIATRIC SURGERY EXAMINATION
TO BE HELD IN AUGUST 2014

MASTER CHART

GROUP	HOSPITAL NO	GENDER	DOB	AGE AT EXAMINATIC	DATE OF FIRST VISIT	OTHER VISIT DATES	CURRENT AMBULAT(	AMBULATION AIDS II
1	449318F	F	01.09.2002	11 YEARS	01.04.2013	18/10/2013	INDEPENDENT	NO
1	036499F	F	15.06.2008	05 YEARS	17.10.2011	19/3/2012; 18/2/2013;25	INDEPENDENT	NO
1	686036F	M	24.11.2008	05 YEARS	25.09.2013	2/10/2013	INDEPENDENT	NO
1	215743D	F	01.01.2008	05 YEARS	10.04.2008	12/11/2008; 9/09/2013	CARRIED	PARENTAL AID
1	184775F	M	13.07.2005	08 YEARS	17.04.2012	21/10/2013	INDEPENDENT	AFO
1	579196B	F	26.01.1998	15 YEARS	07.02.2002	20/8/2013;17/1/2014	CARRIED	PARENTAL AID
1	560231B	M	14.11.1997	16 YEARS	14.11.1997	5/5/2001; 10/11/2005; 2	INDEPENDENT	NO
1	085634D	M	20.08.2007	06 YEARS	20.08.2007	14/9/2009; 31/5/2010; 1	INDEPENDENT	NO
1	473317D	F	09.10.1997	16 YEARS	02.06.2009	11/5/2010; 21/6/2011; 1	INDEPENDENT	NO
1	196304D	F	04.03.2008	05 YEARS	31.03.2008	4/03/2009; 20/11/2012; (	CARRIED	PARENTAL AID
1	369399C	M	29.01.2003	10 YEARS	21.09.2004	22/10/2005; 18/06/2009;	INDEPENDENT	PARENTAL AID
1	440797F	F	25.04.2001	12 YEARS	28.03.2013	8/10/2013	INDEPENDENT	NO
1	452904F	M	20.04.2003	10 YEARS	06.04.2013	.	INDEPENDENT	NO
1	622532D	F	12.08.2008	05 YEARS	02.02.2010	23/04/2011; 29/01/2013;	INDEPENDENT	NO
1	845107C	F	21.06.2006	08 YEARS	22.06.2006	10/05/2007, 29/05/2008,	CARRIED	PARENTAL AID
1	746737F	M	02.06.2008	05 YEARS	06.12.2013	.	CARRIED	PARENTAL AID
1	135144F	M	05.08.2008	05 YEARS	15.02.2012	18/07/2012; 8/02/2013; 2	INDEPENDENT	NO
1	212542F	M	25.06.2006	07 YEARS	24.05.2012	26/3/2013; 19/12/2013	CARRIED	PARENTAL AID
1	845107C	F	20.06.2006	07 YEARS	20.06.2006	27/09/2007; 25/08/2008;	CARRIED	PARENTAL AID
1	499755D	M	22.11.2004	09 YEARS	17.07.2009	11/6/2013	INDEPENDENT	NO
1	365223C	F	13.10.2003	10 YEARS	13.10.2003	2/12/2004; 31/3/2005; 2(	INDEPENDENT	PARENTAL AID
1	735584C	F	02.05.2003	10 YEARS	23.11.2005	14/03/2006; 28/2/2007;	INDEPENDENT	NO
1	029535D	M	21.05.2007	06 YEARS	21.05.2007	24/11/2008; 11/11/2009;	INDEPENDENT	NO
1	425443C	M	20.12.1996	17 YEARS	09.02.2004	12/11/2013	INDEPENDENT	NO
1	634528C	F	10.01.2005	08 YEARS	11.05.2005	20/6/2007; 28/2/2008; 7/	INDEPENDENT	NO
1	316232F	M	27.05.2005	08 YEARS	08.10.2012	7/2/2013; 6/7/2013; 21/1	INDEPENDENT	NO
1	433405C	M	30.12.2003	10 YEARS	26.02.2004	23/8/2005; 2/8/2010; 10/	INDEPENDENT	AFO
1	915297C	F	27.10.2006	07 YEARS	28.10.2007	12/4/2008; 7/3/2010; 12/	INDEPENDENT	NO
1	850299B	F	05.10.1990	23 YEARS	18.10.2004	9/5/2005; 30/6/2006; 16/	INDEPENDENT	NO
2	524698D	M	13.08.2009	48 MONTHS	21.08.2009	7/12/2011; 31/8/2012; 2(	CARRIED	PARENTAL AID
2	901394D	M	01.04.2011	30 MONTHS	02.04.2011	27/9/2011;2/2/2012 14/0	CARRIED	PARENTAL AID
2	046187F	M	12.10.2011	27 MONTHS	12.10.2011	30/8/2012;11/1/2013;27/	CARRIED	PARENTAL AID
2	254189F	M	10.10.2011	27 MONTHS	09.09.2013	22/1/2014	CARRIED	PARENTAL AID
2	657532F	F	07.02.2013	10 MONTHS	30.08.2013	21/10/2013, 22/11/2013,	CARRIED	PARENTAL AID
2	650979F	M	08.08.2013	04 MONTHS	16.08.2013	4/09/2013, 13/12/2013	CARRIED	PARENTAL AID
2	646574F	M	06.08.2013	04 MONTHS	13.08.2013	2/12/2013	CARRIED	PARENTAL AID
2	664476F	F	07.09.2013	02 MONTHS	11.09.2013	28/10/2013	CARRIED	PARENTAL AID
2	707454F	M	22.10.2013	02 MONTHS	22.11.2013	7/12/2013	CARRIED	PARENTAL AID
2	354323F	M	24.11.2012	12 MONTHS	24.11.2012	5/1/2013, 7/5/2013, 7/11	CARRIED	PARENTAL AID
2	354313F	M	24.11.2012	14 MONTHS	24.11.2012	4/7/2013, 7/1/2014	CARRIED	PARENTAL AID
2	382188F	M	22.07.2010	36 MONTHS	08.01.2013	2/2/2013, 4/7/2013	CARRIED	PARENTAL AID
2	014227F	M	21.08.2011	22 MONTHS	01.09.2011	19/03/2013 27/6/2013	CARRIED	PARENTAL AID
2	678101F	M	20.08.2013	05 MONTHS	14.09.2013	7/1/2014	CARRIED	PARENTAL AID
2	664394F	F	24.09.2013	03 MONTHS	24.09.2013	5/12/2013	CARRIED	PARENTAL AID
2	688202F	M	25.10.2013	03 MONTHS	25.10.2013	12/1/2014	CARRIED	PARENTAL AID

2 628536F	M	28.05.2013	03 MONTHS	18.07.2013	5/8/2013	CARRIED	PARENTAL AID
2 639918F	F	25.08.2013	04 MONTHS	04.09.2013	11/12/2013	CARRIED	PARENTAL AID
2 644871F	M	12.02.2013	06 MONTHS	08.08.2013	.	CARRIED	PARENTAL AID
2 647510F	M	14.07.2013	06 MONTHS	10.08.2013	23/1/2014	CARRIED	PARENTAL AID
2 631586F	M	18.06.2013	01 MONTH	27.07.2013	.	CARRIED	PARENTAL AID
2 637066F	F	02.09.2012	14 MONTHS	29.07.2013	18/11/2013	CARRIED	PARENTAL AID
2 361994F	M	17.11.2012	09 MONTHS	07.02.2013	10/8/2013	CARRIED	PARENTAL AID
2 421942F	M	26.02.2013	05 MONTHS	26.02.2013	4/7/2013	CARRIED	PARENTAL AID
2 180418F	F	21.04.2012	09 MONTHS	21.04.2012	11/1/2013	CARRIED	PARENTAL AID
2 214061F	F	05.05.2012	19 MONTHS	07.06.2012	3/12/2013	CARRIED	PARENTAL AID
2 261399F	M	22.06.2012	11 MONTHS	02.08.2012	26/4/2013, 30/05/2013	CARRIED	PARENTAL AID
2 828876D	F	15.11.2010	37 MONTHS	16.11.2010	10/05/2011; 27/12/2011;	INDEPENDENT	NO
2 333048F	M	24.08.2012	10 MONTHS	26.10.2012	23/1/2013; 12/6/2013	CARRIED	PARENTAL AID
2 337933F	M	20.07.2012	16 MONTHS	02.11.2012	28/5/2013; 26/11/2013	CARRIED	PARENTAL AID
2 350584F	M	12.11.2012	14 MONTHS	19.11.2012	24/6/2013; 8/1/2014	CARRIED	PARENTAL AID
2 127469F	F	09.09.2011	24 MONTHS	17.02.2012	16/09/2013	CARRIED	PARENTAL AID
2 804379D	M	24.10.2010	31 MONTHS	23.10.2010	28/02/2012;14/5/2013	CARRIED	PARENTAL AID
2 770126D	M	29.08.2010	31 MONTHS	30.08.2010	6/6/2011; 16/12/2011; 5/	INDEPENDENT	NO
2 086903F	M	08.11.2011	27 MONTHS	30.11.2011	3/12/2012, 7/2/2014	INDEPENDENT	NO
2 925175D	M	10.04.2011	31 MONTHS	15.04.2011	11/5/2012; 25/01/2013; 1	CARRIED	PARENTAL AID
2 973118D	F	21.06.2011	19 MONTHS	30.06.2011	24/1/2012; 22/1/2013	CARRIED	PARENTAL AID
2 924269D	M	21.04.2011	34 MONTHS	02.05.2011	13/9/2011; 23/1/2012; 2'	INDEPENDENT	NO
2 710241D	M	20.12.2009	50 MONTHS	01.06.2010	19/6/2012; 22/1/2013; 2:	CARRIED	PARENTAL AID

ANC DIAGNOSIS	PLACE OF DELIVERY	TYPE OF DELIVERY	GESTATIONAL AGE A	BIRTH WEIGHT	TYPE OF LESION	VERTEBRAL LEVELS	NEUROLOGICAL PRO	CDH
NO	INSTITUTIONAL	NORMAL	38 WEEKS	3.5 KG	MMC	LUMBAR & SACRAL	NO	UNILATERAL
NO	INSTITUTIONAL	NORMAL	37 WEEKS	2.3 KG	MMC	SACRAL	NO	NO
NO	INSTITUTIONAL	LSCS- TRANSVERSE I	40 WEEKS	3.5 KG	MMC	SACRAL	NO	NO
NO	INSTITUTIONAL	LSCS- PREVIOUS CS	40 +2 WEEKS	3.5 KG	MMC	SACRAL	HYDROCEPHALUS	BILATERAL
NO	INSTITUTIONAL	LSCS	36 WEEKS	2.5 KG	MMC	LUMBAR & SACRAL	HYDROCEPHALUS	BILATERAL
NO	INSTITUTIONAL	NORMAL	40 WEEKS	3.0 KG	MMC	LUMBAR & SACRAL	NO	NO
NO	INSTITUTIONAL	NORMAL	40 WEEKS	3.8 KG	MMC	SACRAL	NO	NO
NO	INSTITUTIONAL	LSCS	40 WEEKS	3.75 KG	MMC	SACRAL	NO	NO
YES	INSTITUTIONAL	NORMAL	36 WEEKS	3.2 KG	MMC	LUMBAR	NO	NO
NO	INSTITUTIONAL	LSCS	40 WEEKS	3.0 KG	MMC	SACRAL	NO	NO
NO	INSTITUTIONAL	NORMAL	38 WEEKS	2.5 KG	LMC	LUMBAR & SACRAL	NO	UNILATERAL
NO	INSTITUTIONAL	NORMAL	40 WEEKS	2.0 KG	MMC	SACRAL	NO	NO
NO	INSTITUTIONAL	LSCS	40 WEEKS	2.5 KG	MMC	SACRAL	NO	NO
NO	INSTITUTIONAL	NORMAL	39 WEEKS	3.5 KG	MMC	SACRAL	NO	NO
YES	HOME	NORMAL	40 WEEKS	3.0 KG	MMC	LUMBAR	NO	NO
YES	INSTITUTIONAL	NORMAL	32 WEEKS	2.5 KG	MMC	LUMBAR & SACRAL	HYDROCEPHALUS	NO
NO	INSTITUTIONAL	LSCS	37 WEEKS	2.9 KG	MMC	LUMBAR	NO	NO
NO	INSTITUTIONAL	NORMAL	40 WEEKS	3.0 KG	MMC	LUMBAR	NO	NO
YES	HOME	NORMAL	40 WEEKS	2.5 KG	MMC	LUMBAR	NO	NO
NO	INSTITUTIONAL	NORMAL	38 WEEKS	2.5 KG	LMC	LUMBAR	NO	NO
NO	INSTITUTIONAL	NORMAL	40 WEEKS	2.5 KG	MMC	LUMBAR	NO	NO
NO	INSTITUTIONAL	NORMAL	40 WEEKS	3.5 KG	MMC	LUMBAR	NO	NO
NO	INSTITUTIONAL	NORMAL	39 WEEKS	2.7 KG	MMC	SACRAL	NO	NO
NO	INSTITUTIONAL	NORMAL	40 WEEKS	2.5 KG	MMC	SACRAL	NO	NO
YES	INSTITUTIONAL	NORMAL	36 WEEKS	1.7 KG	MMC	LUMBAR	NO	NO
NO	INSTITUTIONAL	NORMAL	40 WEEKS	3.5 KG	MMC	SACRAL	NO	NO
NO	INSTITUTIONAL	NORMAL	42 WEEKS	3.5 KG	MMC	LUMBAR AND SACRA	NO	NO
YES	INSTITUTIONAL	LSCS	37 WEEKS	2.5 KG	MMC	SACRAL	HYDROCEPHALUS	NO
NO	INSTITUTIONAL	NORMAL	40 WEEKS	2.0 KG	MMC	LUMBAR AND SACRA	NO	NO
NO	INSTITUTIONAL	NORMAL	40 WEEKS	3.0 KG	MMC	LUMBAR & SACRAL	NO	BILATERAL
NO	INSTITUTIONAL	NORMAL	37 WEEKS	2.0 KG	MMC	LUMBAR AND SACRA	NO	NO
NO	INSTITUTIONAL	LSCS	40 WEEKS	3.25 KG	MMC	LUMBAR	NO	NO
NO	INSTITUTIONAL	NORMAL	40 WEEKS	3.50 KG	LMC	LUMBAR	NO	UNILATERAL LEFT
NO	INSTITUTIONAL	NORMAL	37 WEEKS	3.50 KG	MMC	LUMBAR AND SACRA	HYDROCEPHALUS	BILATERAL
NO	INSTITUTIONAL	NORMAL	40 WEEKS	3.0 KG	MMC	LUMBAR	NO	NO
YES	INSTITUTIONAL	NORMAL	36 WEEKS	2.75 KG	MMC	LUMBAR	NO	NO
NO	INSTITUTIONAL	NORMAL	37 WEEKS	3.25 KG	MMC	SACRAL	NO	NO
NO	INSTITUTIONAL	NORMAL	39 WEEKS	3.5 KG	MMC	SACRAL	NO	NO
NO	INSTITUTIONAL	NORMAL	40 WEEKS	3.0 KG	MC	SACRAL	NO	NO
NO	INSTITUTIONAL	NORMAL	36 WEEKS	2.5 KG	MMC	LUMBAR AND SACRA	NO	BILATERAL
NO	INSTITUTIONAL	NORMAL	37 WEEKS	2.75 KG	MMC	LUMBAR	HYDROCEPHALUS	BILATERAL
NO	INSTITUTIONAL	LSCS	35 WEEKS	2.25 KG	MMC	LUMBAR	NO	NO
NO	INSTITUTIONAL	NORMAL	40 WEEKS	3.0 KG	MMC	LUMBAR AND SACRA	NO	NO
NO	INSTITUTIONAL	NORMAL	40 WEEKS	3.2 KG	MMC	LUMBAR	NO	NO
NO	INSTITUTIONAL	NORMAL	36 WEEKS	2.75 KG	MMC	THORACIC	NO	NO

NO	INSTITUTIONAL	NORMAL	39 WEEKS	3.0 KG	MMC	LUMBAR	NO	NO
NO	INSTITUTIONAL	LSCS	40 WEEKS	3.0 KG	MMC	LUMBAR	NO	NO
NO	INSTITUTIONAL	LSCS	35 WEEKS	2.5 KG	MMC	LUMBAR	NO	NO
NO	INSTITUTIONAL	NORMAL	40 WEEKS	3.25 KG	MMC	LUMBAR	NO	NO
NO	INSTITUTIONAL	NORMAL	38 WEEKS	3.0 KG	MC	LUMBAR	NO	NO
NO	INSTITUTIONAL	LSCS	37 WEEKS	3.5 KG	MMC	LUMBAR AND SACRA	NO	NO
YES	INSTITUTIONAL	LSCS	37 WEEKS	3.0 KG	LMC	LUMBAR	NO	NO
NO	INSTITUTIONAL	NORMAL	38 WEEKS	3.0 KG	MMC	LUMBAR	NO	NO
NO	INSTITUTIONAL	NORMAL	40 WEEKS	3.25 KG	MC	THORACIC	NO	NO
NO	INSTITUTIONAL	NORMAL	38 WEEKS	3.0 KG	MMC	LUMBAR	NO	UNILATERAL LEFT
NO	INSTITUTIONAL	NORMAL	40 WEEKS	3.25 KG	MMC	LUMBAR	NO	NO
NO	INSTITUTIONAL	NORMAL	40 WEEKS	2.75 KG	MC	THORACIC	NO	NO
NO	INSTITUTIONAL	LSCS	37 WEEKS	3.0 KG	MMC	LUMBAR AND SACRA	NO	NO
NO	INSTITUTIONAL	NORMAL	40 WEEKS	3.0 KG	MMC	LUMBAR AND SACRA	NO	NO
YES	INSTITUTIONAL	NORMAL	38 WEEKS	2.75 KG	MMC	LUMBAR	NO	NO
NO	INSTITUTIONAL	NORMAL	40 WEEKS	2.25 KG	MMC	LUMBAR	NO	NO
NO	INSTITUTIONAL	NORMAL	40 WEEKS	2.5 KG	MMC	LUMBAR	NO	NO
NO	INSTITUTIONAL	NORMAL	40 WEEKS	2.5 KG	MMC	LUMBAR	NO	NO
NO	INSTITUTIONAL	LSCS	39 WEEKS	2.25 KG	MMC	LUMBAR	NO	NO
NO	INSTITUTIONAL	NORMAL	40 WEEKS	2.25 KG	MMC	LUMBAR AND SACRA	NO	NO
NO	INSTITUTIONAL	LSCS	40 WEEKS	2.75 KG	MMC	LUMBAR	NO	NO
NO	INSTITUTIONAL	NORMAL	38 WEEKS	3.0 KG	MMC	SACRAL	NO	NO
NO	INSTITUTIONAL	NORMAL	36 WEEKS	3.9 KG	MMC	LUMBAR AND SACRA	NO	BILATERAL

CTEV	SECONDARY SPINAL	OTHER ANOMALIES	FAMILIAL AND CHRC	TYPE OF REPAIR	DATE OF SURGERY	VP SHUNT	DATE OF VP SHUNT S	POST OP COMPLICAT
NO	NO	NO	NO	PRIMARY CLOSURE	Mar-03	YES	Mar-03	INFECTION
NO	NO	NO	NO	PRIMARY CLOSURE	Jul-08	NO	N/A	NO
NO	NO	NO	NO	PRIMARY CLOSURE	Dec-08	NO	N/A	NO
NO	NO	NO	NO	PRIMARY CLOSURE	May-08	YES	May-08	NO
BILATERAL	NO	SEIZURE	NO	PRIMARY CLOSURE	Jul-05	YES	Oct-05	NO
BILATERAL	YES	NO	NO	NO	.	NO	N/A	NO
NO	NO	NO	NO	PRIMARY CLOSURE	Nov-97	NO	N/A	INFECTION
NO	NO	NO	NO	PRIMARY CLOSURE	Aug-07	NO	N/A	NO
NO	NO	NO	NO	PRIMARY CLOSURE	Oct-97	NO	N/A	NO
BILATERAL	NO	NO	NO	FLAP CLOSURE	Mar-08	NO	N/A	INFECTION
BILATERAL	NO	ARM WITH RIGHT UD	NO	PRIMARY CLOSURE	Feb-03	NO	N/A	INFECTION
NO	NO	NO	NO	PRIMARY CLOSURE	Jul-01	NO	N/A	NO
NO	NO	NO	NO	PRIMARY CLOSURE	Oct-03	NO	N/A	NO
NO	NO	NO	NO	PRIMARY CLOSURE	Aug-08	NO	N/A	NO
UNILATERAL	NO	SHORTENING OF LEF	NO	PRIMARY CLOSURE	Jun-06	NO	N/A	NO
NO	NO	NO	NO	PRIMARY CLOSURE	Jun-08	YES	Sep-08	NO
NO	NO	NO	NO	PRIMARY CLOSURE	Aug-08	NO	N/A	NO
NO	NO	NO	NO	PRIMARY CLOSURE	Jun-06	NO	N/A	NO
NO	NO	LEFT LOWER LIMB P/	NO	PRIMARY CLOSURE	Jun-06	NO	N/A	NO
NO	NO	NO	NO	NO	.	NO	N/A	N/A
NO	NO	NO	NO	PRIMARY CLOSURE	Oct-03	NO	N/A	NO
NO	NO	PARTIAL SACRAL AG	NO	PRIMARY CLOSURE	Nov-03	NO	N/A	NO
NO	NO	NO	NO	PRIMARY CLOSURE	May-07	NO	N/A	NO
NO	NO	NO	NO	PRIMARY CLOSURE	Dec-96	NO	N/A	NO
NO	NO	NO	NO	PRIMARY CLOSURE	May-05	NO	N/A	NO
NO	NO	NO	NO	PRIMARY CLOSURE	Oct-05	NO	N/A	NO
UNILATERAL	NO	NO	NO	PRIMARY CLOSURE	Jan-04	NO	N/A	NO
NO	NO	NO	NO	PRIMARY CLOSURE	Oct-06	YES	Jun-09	NO
NO	NO	NO	NO	NO	.	NO	N/A	N/A
BILATERAL	YES	NO	NO	PRIMARY CLOSURE	Aug-09	NO	N/A	INFECTION
NO	NO	NO	NO	PRIMARY CLOSURE	Apr-11	NO	N/A	INFECTION
NO	NO	NO	NO	PRIMARY CLOSURE	Oct-11	NO	N/A	NO
NO	NO	NO	NO	PRIMARY CLOSURE	Oct-13	NO	N/A	NO
NO	NO	NO	NO	PRIMARY CLOSURE	Sep-13	YES	Dec-13	INFECTION, MENINGI
NO	NO	NO	NO	PRIMARY CLOSURE	Aug-13	NO	N/A	NO
NO	NO	NO	NO	PRIMARY CLOSURE	Sep-13	NO	N/A	NO
NO	NO	NO	NO	PRIMARY CLOSURE	Dec-13	NO	N/A	INFECTION
NO	NO	NO	NO	PRIMARY CLOSURE	Oct-13	NO	N/A	NO
NO	NO	NO	NO	PRIMARY CLOSURE	Nov-12	NO	N/A	NO
NO	NO	NO	NO	PRIMARY CLOSURE	Nov-12	NO	N/A	INFECTION, URINARY
BILATERAL	NO	HYPOSPADIAS	NO	PRIMARY CLOSURE	Jul-10	YES	Sep-10	NO
NO	NO	LEFT UDT	NO	PRIMARY CLOSURE	Aug-11	NO	N/A	NO
NO	NO	NO	NO	PRIMARY CLOSURE	Sep-13	NO	N/A	NO
NO	NO	NO	NO	PRIMARY CLOSURE	Sep-13	NO	N/A	NO
NO	NO	NO	NO	PRIMARY CLOSURE	Oct-13	NO	N/A	NO

NO	NO	NO	NO	PRIMARY CLOSURE		Jul-13	NO	N/A		NO
NO	NO	NO	NO	PRIMARY CLOSURE		Sep-13	NO	N/A		NO
NO	NO	NO	NO	PRIMARY CLOSURE		Aug-13	NO	N/A		NO
NO	NO	NO	NO	PRIMARY CLOSURE		Aug-13	NO	N/A		NO
NO	NO	NO	NO	PRIMARY CLOSURE		Aug-13	NO	N/A		NO
NO	NO	NO	NO	PRIMARY CLOSURE		Aug-13	NO	N/A		INFECTION
NO	NO	NO	NO	PRIMARY CLOSURE		Jan-13	NO	N/A		NO
NO	NO	NO	NO	PRIMARY CLOSURE		Jun-13	NO	N/A		NO
NO	NO	NO	NO	PRIMARY CLOSURE		Apr-12	NO	N/A		NO
NO	NO	NO	NO	PRIMARY CLOSURE		May-12	NO	N/A		NO
NO	NO	CROSSED FUSED LEF	NO	PRIMARY CLOSURE		Aug-12	YES		Apr-13	NO
NO	NO	NO	NO	PRIMARY CLOSURE		Nov-10	NO	N/A		NO
UNILATERAL	NO	NO	NO	PRIMARY CLOSURE		Oct-12	NO	N/A		INFECTION, MENINGI
NO	NO	NO	NO	PRIMARY CLOSURE		Nov-12	NO	N/A		NO
NO	NO	NO	NO	PRIMARY CLOSURE		Nov-12	NO	N/A		NO
NO	NO	ARTHROGRYPHOSIS I	NO	PRIMARY CLOSURE		Feb-12	NO	N/A		NO
NO	NO	NO	NO	PRIMARY CLOSURE		Oct-10	NO	N/A		NO
NO	NO	NO	NO	PRIMARY CLOSURE		Aug-10	NO	N/A		NO
NO	NO	NO	NO	PRIMARY CLOSURE		Nov-11	NO	N/A		NO
NO	NO	NO	NO	PRIMARY CLOSURE		Apr-11	NO	N/A		NO
NO	NO	NO	NO	PRIMARY CLOSURE		Jul-11	NO	N/A		NO
NO	NO	NO	NO	PRIMARY CLOSURE		Apr-11	NO	N/A		NO
BILATERAL	NO	SOLITARY RIGHT KII	NO	NO	N/A		NO	N/A		NO

IMMEDIATE POST OP HC		WEIGHT	HEIGHT	MOTOR - HIP	KNEE	ANKLE	CONTRACTURES	SENSORY SORE
NOT SURE	44 CM	29 KG	139 CM	YES	YES	YES	NO	YES
NOT SURE	43 CM	23 KG	108 CM	YES	YES	YES	NO	NO
NOT SURE	42 CM	13 KG	91 CM	YES	YES	YES	NO	YES
NOT SURE	55 CM	12 KG	94 CM	YES	YES	YES	YES	NO
NOT SURE	49 CM	22 KG	108 CM	YES	YES	NO	NO	NO
NO	54 CM	19 KG	128 CM	NO	NO	NO	YES	YES
NOT SURE	48 CM	42 KG	152 CM	YES	YES	YES	NO	YES
NOT SURE	54 CM	21 KG	116 CM	YES	YES	YES	NO	NO
NO CHANGE	55 CM	52 KG	142 CM	YES	YES	YES	YES	NO
NOT SURE	47 CM	14 KG		NO	NO	NO	NO	YES
NOT SURE	54 CM	40 KG		YES	YES	YES	NO	NO
NOT SURE	55 CM	38 KG	145 CM	YES	YES	YES	NO	NO
NOT SURE	49 CM	20 KG	130 CM	YES	YES	NO	NO	YES
NOT SURE	48 CM	18 KG	126 CM	YES	YES	YES	NO	NO
NOT SURE	54 CM	18 KG	102 CM	YES	NO	NO	YES	NO
NOT SURE	51 CM	12 KG	90 CM	YES	YES	NO	NO	NO
NOT SURE	54 CM	18 KG	105 CM	YES	YES	YES	NO	NO
NOT SURE	52 CM	18 KG	110 CM	YES	YES- RIGHT	NO	NO	YES
NOT SURE	51 CM	17 KG	103 CM	YES	NO(L); YES®	NO(L); YES®	NO(L); YES®	YES
N/A	48 CM	16 KG	111 CM	YES	YES	YES	NO	YES
NOT SURE	56 CM	24 KG	121 CM	YES	YES	YES	NO	NO
NOT SURE	54 CM	21 KG	122 CM	YES	YES	YES	NO	NO
NOT SURE	42 CM	16 KG	109 CM	YES	YES	YES	NO	YES
NOT SURE	54 CM	37 KG	160 CM	YES	YES	YES	NO	NO
NOT SURE	50 CM	14 KG	91 CM	YES	YES	YES	NO	NO
NO CHANGE	49 CM	20 KG	120 CM	YES	YES	YES	NO	NO
NOT SURE	53 CM	24 KG	117 CM	YES	YES	NO	NO	YES
NO CHANGE	52 CM	13 KG	92 CM	YES	YES	YES	NO	NO
N/A	54 CM	36 KG	150 CM	YES	YES	NO	NO	YES
NOT SURE	48 CM	16 KG	104 CM	NO	NO	NO	YES	YES
NOT SURE	44 CM	12 KG	83 CM	YES	YES	YES	NO	NO
NOT SURE	48 CM	13 KG	84 CM	YES	YES	NO	NO	NO
NOT SURE	46 CM	10 KG	87 CM	YES	YES	NO	NO	NO
NOT SURE	48 CM	5.25 KG	56 CM	NO	NO	NO	NO	NO
NOT SURE	37 CM	5.5 KG	57 CM	YES	YES	NO	NO	NO
NOT SURE	37 CM	5.0 KG	55 CM	YES	YES	YES	NO	NO
NOT SURE	34 CM	4.0 KG	47 CM	YES	YES	YES	NO	NO
NOT SURE	38 CM	4.5 KG	57 CM	YES	YES	YES	NO	NO
NOT SURE	42 CM	9 KG	74 CM	YES	YES	YES	NO	NO
DETERIORATED	44 CM	8 KG	71 CM	NO	NO	NO	NO	NO
DETERIORATED	51 CM	9 KG	80 CM	NO	NO	NO	NO	YES
NOT SURE	47 CM	12 KG	86 CM	YES	YES	NO	NO	NO
NOT SURE	38 CM	5 KG	54 CM	YES	YES	NO	NO	NO
NOT SURE	36 CM	4.5 KG	54 CM	YES	YES	NO	NO	NO
NOT SURE	36 CM	4.5 KG	53 CM	YES	YES	YES	NO	NO

NOT SURE	38 CM	4.0 KG	54 CM	YES	YES	NO	NO	NO
NOT SURE	38 CM	5.0 KG	55 CM	YES	YES	NO	NO	NO
NOT SURE	40 CM	6.0 KG	60 CM	YES	YES	NO	NO	NO
NOT SURE	41 CM	8.25 KG	62 CM	YES	YES	NO	NO	NO
NO CHANGE	35 CM	4.0 KG	48 CM	YES	YES	YES	NO	NO
DETERIORATED	46 CM	10 KG	73 CM	YES	NO	NO	NO	NO
NOT SURE	44 CM	9.5 KG	73 CM	YES	YES	NO	NO	NO
NOT SURE	38 CM	5.0 KG	54 CM	YES	YES	NO	NO	NO
NO CHANGE	42 CM	8.5 KG	64 CM	YES	YES	YES	NO	NO
NO CHANGE	47 CM	11 KG	76 CM	YES	NO	NO	NO	NO
NO CHANGE	49 CM	7.6 KG	69 CM	YES	YES	NO	NO	NO
NOT SURE	52 CM	13 KG	85 CM	YES	YES	YES	NO	NO
NOT SURE	45 CM	11 KG	74 CM	YES	YES	NO	NO	NO
NOT SURE	44 CM	10 KG	72 CM	YES	YES	YES	NO	NO
NO CHANGE	49 CM	10 KG	74 CM	YES	YES	NO	NO	NO
NOT SURE	50 CM	11 KG	77 CM	NO	YES	NO	NO	NO
NO CHANGE	52 CM	13 KG	80 CM	YES	YES	NO	NO	NO
NO CHANGE	51 CM	14 KG	84 CM	YES	YES	YES	NO	NO
NO CHANGE	49 CM	11 KG	82 CM	YES	YES	YES	NO	NO
NOT SURE	46 CM	9 KG	76 CM	YES	YES	NO	NO	NO
NOT SURE	43 CM	6 KG	73 CM	YES	NO	NO	NO	NO
NO CHANGE	44 CM	9 KG	79 CM	YES	YES	YES	NO	NO
N/A	46 CM	11 KG	82 CM	YES	NO	NO	NO	NO

LEVEL OF SENSATIO	SADDLE ANAESTHES	ANAL TONE	BULBO CAVERNOUS	ANAL SENSATION	BLADDER SENSATIO	BLADDER PALPABLE	BLADDER EXPRESSIB	DATE
BILATERAL ANKLE	NO	NO	NO	NO	NO	NO	NO	1/4/2013
FULLY SENSATE	NO	NO	NO	NO	NO	NO	NO	18/10/2011
BILATERAL ANKLE	NO	NO	NO	NO	NO	NO	NO	26/9/2013
BILATERAL THIGH	YES	NO	NO	NO	YES	NO	NO	12/11/2008
BILATERAL KNEE	NO	NO	NO	NO	NO	NO	NO	18/4/2012
BILATERAL HIPS	YES	NO	NO	NO	NO	NO	YES	20/8/2013
BILATERAL FOOT	NO	NO	NO	YES	NO	NO	NO	19/4/2005
BILATERAL FOOT	NO	NO	NO	YES	YES	NO	NO	22/08/2007
FULLY SENSATE	NO	NO	NO	YES	NO	NO	NO	30/9/2009
BILATERAL HIPS	YES	NO	NO	NO	NO	NO	YES	5/3/2008
BILATERAL MID THI	YES	NO	NO	NO	NO	NO	NO	22/10/2005
FULLY SENSATE	NO	NO	NO	NO	NO	NO	NO	28/3/2013
BILATERAL THIGHS	YES	NO	NO	NO	NO	NO	NO	6/4/2013
BILATERAL ANKLES	NO	NO	NO	NO	NO	NO	NO	2/2/2010
BILATERAL HIPS	YES	NO	NO	NO	NO	NO	NO	22/06/2006
BILATERAL THIGHS	YES	NO	NO	NO	NO	NO	YES	29/11/2013
FULLY SENSATE	NO	NO	NO	YES	YES	NO	NO	15/02/2012
BILATERAL KNEES	YES	NO	NO	NO	NO	NO	NO	24/5/2012
BILATERAL HIPS	NO	YES	NO	YES	YES	NO	NO	22/06/2006
BILATERAL ANKLE	YES	NO	NO	YES	YES	NO	NO	13/07/2009
BILATERAL KNEES	NO	NO	NO	YES	NO	NO	NO	6/4/2006
FULLY SENSATE	NO	NO	NO	YES	NO	NO	NO	24/11/2005
BILATERAL FOOT	NO	NO	NO	NO	NO	NO	NO	24/11/2008
FULLY SENSATE	NO	NO	NO	YES	YES	NO	NO	12/2/2004
BILATERAL FOOT	NO	NO	NO	YES	NO	NO	NO	20/6/2007
FULLY SENSATE	NO	YES	YES	YES	NO	NO	NO	9/10/2012
BILATERAL ANKLE	NO	NO	NO	NO	NO	NO	YES	2/8/2010
FULLY SENSATE	NO	NO	NO	YES	NO	NO	NO	10/4/2008
BILATERAL KNEES	YES	NO	NO	YES	NO	NO	NO	9/5/2005
BILATERAL HIPS	YES	NO	NO	N	N	NO	NO	21/8/2009
BILATERAL KNEES	YES	NO	NO	NO	NO	NO	NO	27/09/2011
BILATERAL ANKLE	NO	NO	NO	NO	NO	NO	NO	12/10/2011
BILATERAL ANKLE	NO	NO	NO	NO	NO	NO	NO	9/9/2013
BILATERAL HIPS	YES	NO	NO	N/A	N/A	NO	NO	4/9/2013
BILATERAL ANKLE	NO	NO	NO	N/A	N/A	NO	NO	4/9/2013
BILATERAL ANKLES	NO	NO	NO	N/A	N/A	NO	NO	14/08/2013
FULLY SENSATE	NO	NO	NO	N/A	N/A	NO	NO	11/9/2013
FULLY SENSATE	NO	NO	NO	N/A	N/A	NO	NO	22/11/2013
FULLY SENSATE	YES	YES	YES	N/A	N/A	NO	NO	24/11/2012
BILATERAL HIPS	YES	NO	NO	N/A	N/A	YES	YES	4/7/2013
BILATERAL HIPS	YES	NO	NO	N/A	N/A	NO	NO	11/2/2013
BILATERAL KNEES	NO	NO	NO	NO	NO	NO	NO	24/08/2011
BILATERAL ANKLE	YES	NO	NO	N/A	N/A	NO	NO	14/09/2013
BILATERAL ANKLES	YES	NO	NO	N/A	N/A	NO	NO	24/9/2013
FULLY SENSATE	NO	NO	NO	N/A	N/A	NO	NO	26/10/2013

BILATERAL ANKLES	NO	NO	NO	N/A	N/A	NO	NO	19/7/2013	
BILATERAL ANKLES	NO	NO	NO	N/A	N/A	NO	NO		4/9/2013
BILATERAL KNEES	NO	NO	NO	N/A	N/A	NO	NO		8/8/2013
BILATERAL ANKLES	NO	NO	NO	N/A	N/A	NO	NO		10/8/2013
FULLY SENSATE	NO	YES	YES	N/A	N/A	NO	NO	27/7/2013	
BILATERAL HIPS	YES	NO	NO	N/A	N/A	NO	NO	29/7/2013	
BILATERAL ANKLES	NO	NO	NO	N/A	N/A	NO	NO		2/2/2013
BILATERAL ANKLES	NO	NO	NO	N/A	N/A	NO	NO		4/6/2013
FULLY SENSATE	NO	YES	YES	N/A	N/A	NO	NO		11/1/2013
BILATERAL HIPS	YES	NO	NO	N/A	N/A	NO	NO	29/5/2012	
BILATERAL KNEES	YES	NO	NO	N/A	N/A	NO	NO		2/8/2012
FULLY SENSATE	YES	YES	YES	N/A	N/A	NO	NO	16/11/2010	
BILATERAL ANKLES	YES	NO	NO	N/A	N/A	NO	NO	26/10/2012	
BILATERAL FEET	NO	NO	NO	N/A	N/A	NO	NO		8/11/2012
BILATERAL ANKLE	NO	NO	NO	N/A	N/A	NO	NO	21/11/2012	
BILATERAL KNEES	NO	NO	NO	N/A	N/A	NO	NO	17/2/2012	
BILATERAL HIPS	NO	NO	NO	N/A	N/A	NO	NO	23/10/2010	
FULLY SENSATE	NO	YES	YES	N/A	N/A	NO	NO		7/12/2010
FULLY SENSATE	NO	YES	YES	N/A	N/A	NO	NO	30/11/2011	
BILATERAL KNEES	NO	NO	NO	N/A	N/A	NO	NO	17/4/2011	
BILATERAL KNEES	NO	NO	NO	N/A	N/A	NO	NO		5/7/2011
FULLY SENSATE	NO	YES	YES	N/A	N/A	NO	NO	22/4/2011	
BILATERAL KNEES	YES	NO	NO	NO	NO	NO	NO		4/12/2011

URINE WBC 1	URINE CULTURE 1	SERUM CREATININE	USG 1 RIGHT KIDNEY	USG 1 LEFT PELVIS	PVR-1	BLADDER THICKNES	MCU VUR-1	PVR-1
NO	NO	1.3	13 MM	30 MM	NIL	3 MM	LEFT GR 5 VUR	YES
YES	YES	0.5	NORMAL	NORMAL	34 ML	3.3 MM	LEFT GRADE 4 VUR	YES
YES	YES	1.17	33 MM	27 MM	44 ML	2 MM	BILATERAL GRADE 5	YES
NO	NO	0.5	16 MM	15 MM	0 ML	2 MM	RIGHT GRADE 5 AND	YES
YES	YES	0.7	5 MM	8 MM	0 ML	2 MM	N/A	N/A
YES	YES	2.43	15 MM	15 MM	30 ML	4 MM	RIGHT GRADE 4	YES
N/A	N/A	0.6	NORMAL	NORMAL	0 ML	2 MM	N/A	N/A
NO	NO	0.4	NORMAL	NORMAL	0 ML	2 MM	N/A	N/A
YES	YES	0.7	10 MM	NORMAL	10 ML	4 MM	RIGHT GRADE 3	YES
NO	NO	0.6	N/A	N/A	N/A	N/A	N/A	N/A
NO	NO	0.6	NORMAL	20 MM	0 ML	2 MM	NO	YES
YES	YES	0.8	NORMAL	10 MM	120 ML	4 MM	NO	YES
NO	NO	0.61	NORMAL	NORMAL	4 ML	4 MM	NO	NO
YES	YES	0.5	NORMAL	10 MM	0 ML	4 MM	LEFT GRADE 1	NO
NO	NO	0.4	N/A	N/A	N/A	N/A	N/A	N/A
YES	YES	0.8	12 MM	11.7 MM	20 ML	2 MM	BILATERAL GRADE 4	YES
YES	YES	0.71	15 MM	23 MM	0 ML	4 MM	BILATERAL GRADE 5	YES
YES	YES	0.54	NORMAL	NORMAL	6 ML	5 MM	NO	YES
YES	YES	0.3	NORMAL	NORMAL	0 ML	2 MM	N/A	N/A
YES	NO	0.6	NORMAL	NORMAL	45 ML	2 MM	NO	YES
NO	NO	0.5	NORMAL	NORMAL	30 ML	2 MM	NO	NO
NO	NO	0.5	NORMAL	NORMAL	20 ML	3.8 MM	LEFT GRADE 2	YES
NO	NO	0.4	NORMAL	NORMAL	0 ML	2 MM	N/A	N/A
N/A	N/A	0.5	NORMAL	NORMAL	35 ML	5 MM	NO	YES
YES	YES	1.3	8 MM	8 MM	5 ML	4 MM	NO	YES
YES	YES	1.65	31 MM	25 MM	20 ML	8 MM	NO	YES
NO	NO	0.5	NORMAL	NORMAL	20 ML	3 MM	NO	NO
YES	YES	0.4	NORMAL	NORMAL	0 ML	3 MM	N/A	N/A
N/A	N/A	0.6	NORMAL	NORMAL	200 ML	3 MM	N/A	N/A
NO	N/A	0.3	NORMAL	NORMAL	3 ML	2 MM	N/A	N/A
NO	NO	0.4	NORMAL	NORMAL	0 ML	2 MM	NO	YES
NO	NO	0.3	N/A	N/A	N/A	N/A	N/A	N/A
NO	NO	0.5	NORMAL	NORMAL	0 ML	2 MM	N/A	N/A
NO	NO	0.4	NORMAL	NORMAL	0 ML	2 MM	N/A	N/A
NO	NO	0.2	NORMAL	NORMAL	11 ML	3 MM	N/A	N/A
NO	NO	0.4	NORMAL	NORMAL	2 ML	2 MM	N/A	N/A
NO	NO	0.3	NORMAL	NORMAL	0 ML	2 MM	N/A	N/A
NO	NO	0.3	NORMAL	NORMAL	0 ML	2 MM	N/A	N/A
NO	NO	0.8	N/A	N/A	N/A	N/A	N/A	N/A
NO	NO	0.39	NORMAL	NORMAL	0 ML	2 MM	N/A	N/A
YES	YES	0.35	17.5 MM	18 MM	0 ML	3 MM	BILATERAL	YES
NO	NO	0.44	N/A	N/A	N/A	N/A	N/A	N/A
NO	NO	0.2	N/A	N/A	N/A	N/A	N/A	N/A
NO	NO	0.3	N/A	N/A	N/A	N/A	N/A	N/A
NO	NO	0.23	5 MM	5 MM	0 ML	5 MM	N/A	N/A

NO	NO	0.39	NORMAL	NORMAL	0 ML	2 MM	N/A	N/A
N/A	N/A	0.2	NORMAL	NORMAL	0 ML	2 MM	N/A	N/A
N/A	N/A	0.5	NORMAL	5 MM	0 ML	2 MM	N/A	N/A
N/A	N/A	0.3	N/A	N/A	N/A	N/A	N/A	N/A
NO	NO	0.4	NORMAL	NORMAL	0 ML	2 MM	N/A	N/A
N/A	N/A	0.36	NORMAL	NORMAL	0 ML	2 MM	N/A	N/A
N/A	N/A	0.45	N/A	N/A	N/A	N/A	N/A	N/A
NO	NO	0.44	NORMAL	5 MM	5 ML	3 MM	N/A	N/A
NO	NO	0.45	NORMAL	NORMAL	0 ML	2MM	N/A	N/A
NO	NO	0.54	N/A	N/A	N/A	N/A	N/A	N/A
YES	YES	0.6	5 MM	NONE	0 ML	3 MM	N/A	N/A
NO	NO	0.4	NORMAL	NORMAL	0 ML	2 MM	N/A	N/A
NO	NO	0.43	NORMAL	NORMAL	0 ML	2 MM	N/A	N/A
YES	YES	0.4	NORMAL	NORMAL	0 ML	2 MM	N/A	N/A
NO	NO	0.69	NORMAL	NORMAL	0 ML	2 MM	N/A	N/A
N/A	N/A	0.4	NORMAL	NORMAL	0 ML	2 MM	N/A	N/A
N/A	N/A	1	NORMAL	NORMAL	4 ML	2 MM	N/A	N/A
NO	N/A	0.4	NORMAL	NORMAL	0 ML	2 MM	N/A	N/A
N/A	N/A	0.3	N/A	N/A	N/A	N/A	N/A	N/A
NO	N/A	0.4	NORMAL	NORMAL	20 ML	3 MM	N/A	N/A
NO	NO	0.6	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	0.9	NORMAL	NORMAL	0 ML	2 MM	N/A	N/A
YES	YES	2.6	N/A	N/A	N/A	N/A	N/A	N/A

BLADDER NECK CON	DMSA SPLIT L / R -1	SCAR-1	CMG- 1	DATE-2	WBC-2	CULTURE-2	SERUM CREAT-2	RIGHT PELVIS-2
NO	0 / 100	LEFT SCAR	POORLY COMPLIANT	18/10/2013	YES	NO	1.2	12 MM
NO	N/A	N/A	N/A	19/03/2012	NO	NO	0.64	N/A
NO	44 / 56	NO	HIGH PRESSURE POO	N/A	N/A	N/A	N/A	N/A
NO	N/A	N/A	N/A	11/7/2013	NO	NO	0.68	18 MM
N/A	N/A	N/A	N/A	21/10/2013	YES	YES	0.6	N/A
NO	N/A	N/A	HIGH PRESSURE POO	17/1/2014	NO	N/A	1.13	N/A
N/A	N/A	N/A	N/A	24/12/2008	N/A	N/A	0.7	5 MM
N/A	N/A	N/A	N/A	16/12/2008	N/A	N/A	0.4	NORMAL
NO	N/A	N/A	HIGH PRESSURE POO	21/6/2011	N/A	N/A	0.9	NORMAL
N/A	N/A	N/A	N/A	4/3/2009	N/A	N/A	0.5	NORMAL
NO	N/A	N/A	N/A	20/10/2007	NO	NO	0.6	N/A
NO	N/A	N/A	POORLY COMPLIANT	N/A	N/A	N/A	N/A	N/A
NO	N/A	N/A	POORLY COMPLIANT	N/A	N/A	N/A	N/A	N/A
NO	N/A	N/A	N/A	11/2/2011	NO	NO	0.5	NORMAL
N/A	N/A	N/A	N/A	13/12/2013	YES	YES	0.43	NORMAL
NO	55/ 45	YES	HIGH PRESSURE POO	N/A	N/A	N/A	N/A	N/A
NO	52/48	NO	NORMAL	10/7/2012	YES	NO	0.74	NORMAL
NO	N/A	N/A	N/A	10/5/2013	NO	NO	0.52	N/A
N/A	N/A	N/A	N/A	13/12/2013	YES	YES	N/A	NORMAL
NO	51/ 49	NO	HYPERREFLEXIC BL	12/6/2013	NO	NO	0.38	NORMAL
NO	N/A	N/A	N/A	18/6/2010	NO	NO	0.5	NORMAL
NO	N/A	N/A	N/A	12/5/2007	YES	YES	0.5	NORMAL
N/A	N/A	N/A	N/A	24/11/2009	NO	NO	0.5	NORMAL
NO	N/A	N/A	N/A	12/11/2013	YES	YES	0.8	10 MM
NO	N/A	N/A	HIGH PRESSURE POO	7/11/2009	NO	N/A	0.9	NORMAL
NO	68/ 32	NO	HIGH PRESSURE POO	8/4/2013	N/A	YES	1.35	22 MM
NO	N/A	N/A	HIGH PRESSURE POO	5/10/2011	YES	YES	0.5	NORMAL
N/A	N/A	N/A	N/A	10/3/2010	YES	YES	0.5	NORMAL
N/A	N/A	N/A	N/A	23/6/2008	N/A	N/A	0.7	NORMAL
N/A	N/A	N/A	N/A	7/12/2011	NO	N/A	0.5	NORMAL
NO	N/A	N/A	N/A	2/2/2012	N/A	N/A	0.44	N/A
N/A	N/A	N/A	N/A	21/03/2012	NO	NO	0.46	NORMAL
N/A	N/A	N/A	N/A	22/01/2014	NO	NO		NORMAL
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	16/12/2013	NO	NO	0.2	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	5/1/2013	N/A	N/A	0.48	NORMAL
N/A	N/A	N/A	N/A	7/1/2014	N/A	N/A	0.23	NORMAL
NO	NO	49/ 51	HIGH PRESSURE POO	27/6/2013	YES	NO	0.42	NORMAL
N/A	N/A	N/A	N/A	19/03/2013	NO	NO	0.44	NORMAL
N/A	N/A	N/A	N/A	7/1/2014	N/A	N/A	0.23	NORMAL
N/A	N/A	N/A	N/A	5/12/2013	N/A	N/A	N/A	NORMAL
N/A	N/A	N/A	N/A	12/1/2014	N/A	N/A		N/A

N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	24/12/2103	NO	NO		0.16	NORMAL
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	23/01/2014	NO	NO		0.33	5 MM
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	18/11/2013	NO	NO		0.5	NORMAL
N/A	N/A	N/A	N/A	8/8/2013	N/A	N/A		0.4	NORMAL
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	28/11/2013	YES	YES		0.3	12.5 MM
N/A	N/A	N/A	N/A	29/5/2013	YES	YES		0.58	5 MM
N/A	N/A	N/A	N/A	27/12/2012	N/A	N/A	N/A		NORMAL
N/A	N/A	N/A	N/A	30/5/2013	YES	YES		0.43	NORMAL
N/A	N/A	N/A	N/A	27/5/2013	NO	NO		0.36	NORMAL
N/A	N/A	N/A	N/A	8/1/2014	NO	N/A		0.5	NORMAL
N/A	N/A	N/A	N/A	17/9/2013	NO	N/A		0.43	NORMAL
N/A	N/A	N/A	N/A	23/5/2013	NO	N/A		0.56	NORMAL
N/A	N/A	N/A	N/A	2/12/2011	NO	N/A	N/A		NORMAL
N/A	N/A	N/A	N/A	3/12/2012	N/A	N/A		0.42	NORMAL
N/A	N/A	N/A	N/A	7/5/2012	NO	N/A		0.9	NORMAL
N/A	N/A	N/A	N/A	31/1/2012	N/A	N/A	N/A		NORMAL
N/A	N/A	N/A	N/A	9/11/2011	NO	N/A		0.4	NORMAL
N/A	N/A	N/A	N/A	21/5/2012	YES	YES		4.52	25 MM

LEFT PELVIS-2	PVR-2	BLADDER THICKNES	VUR-2	PVR-2	BN CONTR-2	SPLIT-2	SCAR-2	CMG-2
28 MM	60 ML	3 MM	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	45 / 55	LEFT SCAR	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
19 MM	20 ML	6 MM	BILATERAL GRADE 5	YES	NO	37 / 63	BILATERAL	POORLY COMPLIANT
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5 MM	35 ML	5 MM	NO	YES	NO	N/A	N/A	N/A
NORMAL	0 ML	2 MM	N/A	N/A	N/A	N/A	N/A	N/A
NORMAL	0 ML	2 MM	GRADE 4 LEFT	YES	NO	N/A	N/A	N/A
NORMAL	0 ML	2 MM	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NORMAL	0 ML	2 MM	N/A	N/A	N/A	48/ 52	NO	N/A
NORMAL	0 ML	2 MM	YES- RIGHT GRADE 1	YES	NO	N/A	N/A	POORLY COMPLIANT
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3 MM	NO	3 MM	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NORMAL	9 ML	2 MM	N/A	N/A	N/A	N/A	N/A	N/A
NORMAL	0 ML	2 MM	N/A	N/A	N/A	N/A	N/A	N/A
NORMAL	0 ML	2 MM	N/A	N/A	N/A	N/A	N/A	N/A
NORMAL	0 ML	2.2 MM	N/A	N/A	N/A	N/A	N/A	HIGH PRESSURE POOI
NORMAL	12 ML	2 MM	YES- LEFT GRADE 3	YES	NO	N/A	N/A	HIGH PRESSURE POOI
25 MM	50 ML	3 MM	NO	YES	YES	51/ 49	NO	HIGH PRESSURE POOI
5 MM	0 ML	3 MM	YES	YES	NO	N/A	N/A	N/A
19 MM	30 ML	8 MM	N/A	N/A	N/A	N/A	N/A	N/A
NORMAL	20 ML	2 MM	NO	NO	NO	N/A	N/A	N/A
NORMAL	0 ML	2 MM	YES- RIGHT GRADE 4	YES	NO	56/ 44	YES	HIGH PRESSURE POOI
NORMAL	100 ML	2 MM	N/A	N/A	N/A	N/A	N/A	N/A
NORMAL	0 ML	2 MM	NO	NO	NO	N/A	N/A	N/
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NORMAL	25 ML	2 MM	N/A	N/A	N/A	52/ 48	NO	N/A
NORMAL	14 ML	2 MM	NO	NO	NO	N/A	N/A	GOOD COMPLIANT BI
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/N
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NORMAL	0 ML	2 MM	N/A	N/A	N/A	N/A	N/A	N/A
NORMAL	0 ML	2 MM	NO	NO	NO	N/A	N/A	N/A
NORMAL	0 ML	2 MM	N/A	N/A	N/A	N/A	N/A	N/A
NORMAL	0 ML	2 MM	N/A	N/A	N/A	N/A	N/A	N/A
NORMAL	0 ML	3.5 MM	N/A	N/A	N/A	N/A	N/A	N/A
NORMAL	0 ML	2 MM	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NORMAL	0 ML	2 MM	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5 MM	0 ML	2 MM	YES	NO	NO	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NORMAL	0 ML	2 MM	N/A	N/A	N/A	N/A	N/A	N/A
NORMAL	10 ML	3 MM	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
23.5 MM	0 ML	3 MM	NO	YES	NO	N/A	N/A	HIGH PRESSURE POOI
NONE	0 ML	3 MM	YES	YES	NO	0/ 100	NO	N/A
NORMAL	0 ML	2 MM	N/A	N/A	N/A	N/A	N/A	N/A
NORMAL	0 ML	2 MM	N/A	N/A	N/A	N/A	N/A	N/A
NORMAL	0 ML	2 MM	NO	NO	NO	N/A	N/A	N/A
NORMAL	0 ML	2 MM	N/A	N/A	N/A	N/A	N/A	N/A
NORMAL	0 ML	2 MM	NO	YES	NO	N/A	N/A	N/A
NORMAL	0 ML	2 MM	NO	YES	NO	N/A	N/A	N/A
NORMAL	0 ML	2 MM	N/A	N/A	N/A	N/A	N/A	N/A
NORMAL	0 ML	2 MM	N/A	N/A	N/A	N/A	N/A	N/A
NORMAL	14 ML	2.3 MM	NO	YES	NO	N/A	N/A	N/A
NORMAL	0 ML	2 MM	N/A	N/A	N/A	N/A	N/A	N/A
NORMAL	0 ML	2 MM	N/A	N/A	N/A	N/A	N/A	N/A
NO	5 ML	2 MM	N/A	N/A	N/A	N/A	N/A	N/A

DATE-3	WBC-3	CULTURE-3	CREATININE-3	RIGHT PELVIS-3	LEFT PELVIS-3	PVR-3	BLADDER THICKNES	VUR-3
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
18/02/2013	NO	NO	0.62	NORMAL	NORMAL	30 ML	2 MM	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
15/09/2013	N/A	N/A	0.85	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2/5/2012	NO	N/A	1.02	NORMAL	NORMAL	30 ML	2 MM	N/A
11/5/2012	N/A	N/A	0.58	11 MM	11 MM	65 ML	2 MM	NO
11/8/2012	N/A	N/A	0.8	N/A	N/A	N/A	N/A	N/A
20/11/2012	N/A	N/A	0.51	N/A	N/A	N/A	N/A	N/A
18/06/2009	N/A	N/A	0.6	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
29/01/2013	N/A	N/A	0.61	NORMAL	7 MM	0 ML	2 MM	NO
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5/2/2013	NO	N/A	0.75	4.6 MM	NORMAL	1.5 ML	5 MM	N/A
19/12/2013	YES	YES	0.26	NORMAL	NORMAL	5 ML	9 MM	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
29/4/2013	N/A	N/A	0.7	NORMAL	NORMAL	3 ML	2 MM	NO
16/8/2009	N/A	N/A	0.6	NORMAL	NORMAL	0 ML	3.4 MM	NO
24/9/2012	YES	NO	0.7	7 MM	NORMAL	0 ML	2 MM	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10/8/2012	YES	YES	1.1	NORMAL	8 MM	N/A	N/A	N/A
9/10/2013	N/A	N/A	0.97	17 MM	11 MM	20 ML	3 MM	N/A
22/10/2012	YES	YES	0.6	NORMAL	NORMAL	0 ML	2 MM	NO
12/10/2011	N/A	N/A	0.8	20 MM	10 MM	20 ML	3 MM	YES- LEFT GRADE 4
15/7/2010	NO	N/A	0.7	N/A	N/A	N/A	N/A	N/A
8/10/2012	NO	N/A	0.5	N/A	N/A	N/A	N/A	N/A
8/1/2013	N/A	N/A	0.41	NORMAL	NORMAL	0 ML	2 MM	N/A
30/09/2013	NO	NO	0.44	NORMAL	NORMAL	7 ML	3.2 MM	YES
_ADDER	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4/5/2013	N/A	N/A	0.4	NORMAL	NORMAL	3.5 ML	2.4 MM	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
28/5/2013	NO	NO		0.45	NORMAL	NORMAL	0 ML	2 MM	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
18/9/2012	NO	N/A		0.3	NORMAL	NORMAL	0 ML	2 MM	N/A
7/2/2014	N/A	N/A		0.28	NORMAL	NORMAL	30 ML	4 MM	N/A
9/11/2013	NO	NO	N/A	N/A		N/A	N/A	N/A	N/A
25/1/2013	YES	NO		0.46	NORMAL	NORMAL	50 ML	2 MM	NO
23/7/2012	NO	N/A		0.4	NORMAL	NORMAL	10 ML	2 MM	N/A
11/4/2013	YES	YES		1.87	17 MM	NO	0 ML	2 MM	N/A

PVR-3	BN CONTR-3	SPLIT-3	SCAR-3	CMG-3	DATE-4	WBC-4	CULTURE-4	CREAT-4	
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	25/10/2013	NO	N/A		0.53
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	29/4/2013	NO	NO		1.07
YES	NO	N/A	N/A	N/A	22/05/2013	NO	NO		0.54
N/A	N/A	N/A	N/A	N/A	19/10/2013	NO	N/A		0.85
N/A	N/A	N/A	N/A	N/A	9/7/2013	YES	YES		0.49
N/A	N/A	N/A	N/A	GOOD COMPLIANT Bl	30/05/2013	NO	NO		0.72
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
NO	NO	N/A	N/A	GOOD COMPLIANT Bl	20/08/2013	N/A	N/A		0.53
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	5/12/2013	YES	NO		0.58
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
NO	NO	N/A	N/A	N/A	23/9/2013	N/A	N/A		0.5
YES	NO	39/ 61	NO	N/A	2/5/2013	YES	NO		0.57
N/A	N/A	N/A	N/A	N/A	9/9/2013	NO	NO		0.6
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	30/1/2013	YES	NO		1
N/A	N/A	N/A	N/A	N/A	11/1/2014	N/A	N/A		0.71
N/A	N/A	N/A	N/A	N/A	3/7/2013	YES	YES		0.6
YES	NO	46/ 54	YES	N/A	16/2/2013	N/A	N/A		0.88
N/A	N/A	N/A	N/A	N/A	5/11/2013	N/A	N/A		0.8
N/A	N/A	N/A	N/A	N/A	19/8/2013	N/A	N/A		0.5
N/A	N/A	N/A	N/A	N/A	22/10/2013	N/A	N/A		0.55
YES	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	7/11/2013	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	23/12/2013	NO	NO		0.31
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	20/3/2013	NO	N/A		0.54
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
YES	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	17/1/2013	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	27/1/2014	NO	NO		1.75

RIGHT PELVIS-4	LEFT PELVIS-4	PVR-4	B THICK-4	VUR-4	PVR-4	BN CONTR-4	SPLIT-4	SCAR-4
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NORMAL	NORMAL	3 ML	2 MM	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NORMAL	NORMAL	10 ML	2 MM	N/A	N/A	N/A	N/A	N/A
3 MM	3.7 MM	48 ML	3.6 MM	N/A	N/A	N/A	N/A	N/A
NORMAL	NORMAL	20 ML	2 MM	N/A	N/A	N/A	N/A	N/A
NORMAL	NORMAL	0 ML	5.2 MM	NO	YES	NO	N/A	N/A
NORMAL	20 MM	0 ML	2 MM	NO	YES	NO	50/ 50	NO
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NORMAL	NORMAL	18 ML	2.7 MM	NO	NO	NO	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NORMAL	NORMAL	0 ML	2 MM	N/A	N/A	N/A	N/A	N/A
NORMAL	NORMAL	20 ML	2 MM	N/A	N/A	N/A	N/A	N/A
NORMAL	NORMAL	10 ML	2 MM	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10 MM	10 MM	20 ML	2 MM	N/A	N/A	N/A	N/A	N/A
NORMAL	NORMAL	0 ML	2 MM	YES- LEFT GRADE 3	YES	NO	N/A	N/A
NORMAL	11 MM	20 ML	2 MM	N/A	N/A	N/A	N/A	N/A
NORMAL	NORMAL	20 ML	2 MM	NO	YES	NO	46/ 54	NO
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NORMAL	NORMAL	0 ML	2 MM	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NORMAL	NORMAL	0 ML	2 MM	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NORMAL	NORMAL	0 ML	2 MM	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NORMAL	NORMAL	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NORMAL	NORMAL	14 ML	2 MM	N/A	N/A	N/A	N/A	N/A
11 MM	NO	0 ML	2 MM	N/A	N/A	N/A	N/A	N/A

CMG-4	BLADDER CIC	NIGHT DRAINAGE	ADM. PORT	DRUGS	DRY INTERVAL	CHANGE OF UNDERG	ACE/ BOWEL WASH	ADM PORT
N/A	YES- 3 HOURLY	YES	URETHRA	TROPAN 2.5 MG BD	2 HOURS	3-4/ DAY	YES	RECTUM
N/A	YES- 3 HOURLY	YES	URETHRA	TROPAN 2.5 MG BD	2 HOURS	5/ DAY	YES	RECTUM
N/A	YES- 3 HOURLY	YES	MITROFANOFF	NO	2 HOURS	3-4/ DAY	NO	NO
N/A	YES- 3 HOURLY	YES	MITROFANOFF	NO	3 HOURS	2/ DAY	NO	NO
N/A	YES- 3 HOURLY	YES	MITROFANOFF	NO	30 MINUTES- LEAKS I	4-5/ DAY	YES	RECTUM
N/A	YES- 3 HOURLY	YES	URETHRA	TROPAN	1 HOUR	10/ DAY	MANUAL EVACUATI(	RECTUM
N/A	YES- 3 HOURLY	YES	MITROFANOFF	NO	3 HOURS	1/ DAY	YES	RECTUM
N/A	YES- 3 HOURLY	YES	URETHRA	TROPAN 2.5 MG BD	3 HOURS	1-2/DAY	NO	N/A
GOOD COMPLIANT B/	YES- 4 HOURLY	YES	URETHRA	TROPAN	4 HOURS	1-2/ DAY	NO	N/A
N/A	YES- 3 HOURLY	YES	URETHRA	TROPAN	1.5 HOURS	4-5/DAY	YES	RECTUM
GOOD COMPLIANT B/	YES- 3 HOURLY	YES	URETHRA	TROPAN; AMILENE	2 HOURS	4/ DAY	YES	RECTUM
N/A	YES- 3 HOURLY	YES	URETHRA	TROPAN, AMILENE	3 HOURS	1-2/ DAY	YES	RECTUM
N/A	YES- 3 HOURLY	YES	MITROFANOFF	TROPAN	3 HOURS	2-3 / DAY	YES	RECTUM
N/A	YES- 3 HOURLY	YES	MITROFANOFF	TROPAN	3 HOURS	1-2/ DAY	NO	N/A
N/A	NO	NO	NO	NO	4 HOURS	4-6/ DAY	NO	N/A
N/A	YES- 3 HOURLY	YES	URETHRA	NO	30 MINUTES	15/ DAY	YES	RECTUM
N/A	YES- 3 HOURLY	YES	URETHRA	NO	3 HOURS	1-2/ DAY	NO	N/A
N/A	YES- 3 HOURLY	YES	MITROFANOFF	TROPAN	1 HOUR	6-7/ DAY	YES	RECTUM
N/A	NO	NO	N/A	NO	4 HOURS	1/ DAY	NO	N/A
N/A	NO	NO	N/A	NO	1 HOUR	5-7/ DAY	NO	N/A
N/A	YES- 3 HOURLY	YES	YES	TROPAN	3 HOURS	1-2/ DAY	YES	RECTUM
N/A	YES- 4 HOURLY	YES	URETHRA	TROPAN 2.5 MG BD	4 HOURS	2-3/ DAY	NO	N/A
N/A	YES- 3 HOURLY	YES	URETHRA	TROPAN, AMILENE	30 MINUTES	4-5/ DAY	YES	RECTUM
N/A	YES- 3 HOURLY	YES	URETHRA	NO	3 HOURS	1-2/ DAY	NO	N/A
N/A	YES- 4 HOURLY	YES	MITROFANOFF	TROPAN	4 HOURS	1-2/ DAY	YES	RECTUM
N/A	YES- 3 HOURLY	YES	MITROFANOFF	NO	3 HOURS	1-2/ DAY	NO	N/A
N/A	YES- 3 HOURLY	YES	MITROFANOFF	TROPAN	1 HOUR	7-8/ DAY	YES	RECTUM
N/A	YES- 2 HOURLY	YES	MITROFANOFF	NO	2 HOURS	2-3/ DAY	NO	N/A
GOOD COMPLIANT B/	YES- 3 HOURLY	YES	MITROFANOFF	NO	3 HOURS	1 / DAY	NO	N/A
N/A	YES- 3 HOURLY	YES	URETHRA	TROPAN	1.5 HOURS	5-6/ DAY	YES	RECTUM
N/A	YES- 3 HOURLY	YES	URETHRA	TROPAN	2 HOURS	4-5/ DAY	NO	N/A
N/A	NO	NO	N/A	NO	20 MINUTES	4-5/ DAY	NO	NO
N/A	YES- 3 HOURLY	YES	URETHRA	NO	1 HOUR	6-7/ DAY	YES	RECTUM
N/A	NO	NO	N/A	NO	20 MINUTES	5-6/ DAY	NO	N/A
N/A	NO	NO	N/A	NO	30 MINUTES	5-6/ DAY	NO	N/A
N/A	NO	NO	N/A	NO	2 HOURS	4-5/ DAY	NO	N/A
N/A	NO	NO	N/A	NO	30 MINUTES	6-7/ DAY	NO	N/A
N/A	NO	NO	N/A	NO	1.5 HOURS	5-6/ DAY	NO	N/A
N/A	NO	NO	N/A	NO	4 HOURS	4-5/DAY	NO	N/A
N/A	YES- 3 HOURLY	YES	URETHRA	NO	1.5 HOURS	7-8/ DAY	NO	N/A
N/A	YES- 3 HOURLY	YES	MITROFANOFF	NO	3 HOURS	3-4/ DAY	NO	N/A
N/A	YES- TWICE DAILY	NO	URETHRA	NO	2 HOURS	5-6/ DAY	YES	RECTUM
N/A	YES- TWICE DAILY	NO	URETHRA	NO	2 HOURS	5-6/ DAY	NO	N/A
N/A	NO	NO	N/A	NO	1 HOUR	5-6/ DAY	NO	N/A
N/A	YES- THRICE DAILY	NO	URETHRA	NO	1 HOUR	5-6/ DAY	NO	N/A

N/A	NO	NO	N/A	NO	20 MINUTES	8-10/ DAY	NO	N/A
N/A	NO	NO	N/A	NO	30 MINUTES	7-8/ DAY	NO	N/A
N/A	YES- 3 HOURLY	YES	URETHRA	NO	1 HOUR	7-8/DAY	NO	N/A
N/A	YES- TWICE A DAY	NO	URETHRA	NO	1 HOUR	7-8/ DAY	NO	N/A
N/A	NO	NO	N/A	NO	3 HOURS	4-5/ DAY	NO	N/A
N/A	NO	NO	N/A	NO	1 HOUR	6-7/ DAY	NO	N/A
N/A	NO	NO	N/A	NO	1 HOUR	5-6/ DAY	NO	N/A
N/A	NO	NO	N/A	NO	30 MINUTES	6-8/ DAY	NO	N/A
N/A	NO	NO	N/A	NO	4 HOURS	4-5/ DAY	NO	N/A
N/A	NO	NO	N/A	NO	20 MINUTES	8-9/ DAY	NO	N/A
N/A	YES- 3 HOURLY	YES	URETHRA	NO	1.5 HOURS	6-8/ DAY	NO	N/A
N/A	NO	NO	N/A	NO	3 HOURS	3-4/ DAY	NO	N/A
N/A	NO	NO	N/A	NO	30 MINUTES	7-8/ DAY	NO	N/A
N/A	NO	NO	N/A	NO	3 HOURS	3-4/ DAY	NO	NO
N/A	NO	NO	N/A	NO	2 HOURS	3-4/ DAY	NO	NO
N/A	YES- 2 HOURLY	YES	URETHRA	TROPAN	2 HOURS	3-4/ DAY	YES	RECTUM
N/A	YES- 3 HOURLY	YES	URETHRA	TROPAN	3 HOURS	3-4/ DAY	YES	RECTUM
N/A	NO	NO	N/A	NO	4 HOURS	1-2/ DAY	NO	N/A
N/A	NO	NO	N/A	NO	4 HOURS	2-3/ DAY	NO	N/A
N/A	YES- 3 HOURLY	YES	URETHRA	NO	30 MINUTES	6-7/ DAY	YES	RECTUM
N/A	NO	NO	N/A	NO	1.5 HOURS	7-8/ DAY	NO	N/A
N/A	NO	NO	N/A	NO	3 HOURS	3-4/ DAY	NO	NO
N/A	NO	NO	N/A	NO	10 MINUTES	10-12/ DAY	NO	N/A

DRUGS	INDEPENDENCE	GARMENT CHANGE/ I	OPERATIONS	BARTHELS Q1	Q2	Q3	Q4	Q5	
NO	YES	3-4/DAY	MMC REPAIR FROM E	1	1	1	1	2	
NO	YES	5/ DAY	MMC REPAIR FROM E	1	1	1	1	2	
NO	NO	3-4/ DAY	COLOCYSTOPLASTY	2	0	1	2	2	
NO	NO	2/ DAY	COLOCYSTOPLASTY	1	2	0	0	1	
NO	YES	4-5/ DAY	SURGERIES DONE FR	1	0	0	1	2	
NO	NO	10/ DAY	NO	0	0	0	0	1	
NO	YES	1 / DAY	MMC REPAIR -17/11/1	2	2	1	2	2	
NO	YES	1-2/DAY	MMC REPAIR DONE C	2	2	1	2	2	
NO	YES	1/ DAY	MMC REPAIR FROM E	2	2	1	2	2	
NO	NO	4-5/DAY	MMC REPAIR- 4/03/20	0	0	0	0	1	
NO	YES	4-5/ DAY	MMC AND CUTBACK	1	1	1	2	2	
NO	YES	1-2/ DAY	MMC REPAIR FROM E	1	2	1	1	2	
NO	NO	2-3/ DAY	MMC REPAIR FROM 1	0	1	0	1	2	
NO	YES	1-2/ DAY	MMC REPAIR WITH D	2	2	1	2	2	
NO	YES	1-2/ DAY	MMC REPAIR ON 22/0	1	1	0	1	1	
NO	NO	2-3/ DAY	MMC REPAIR FROM E	0	0	0	0	1	
NO	YES	1/ DAY	MMC REPAIR FROM E	2	2	0	1	2	
NO	YES	1/ DAY	MMC REPIAIR FROM	1	0	1	1	2	
NO	YES	1/ DAY	MMC REPAIR- 22/06/2	2	2	0	1	2	
NO	YES	1/ DAY	NO	1	1	1	1	2	
NO	YES	1-2/ DAY	MMC REPAIR IN 12/20	0	0	0	1	2	
NO	NO	2-3/ DAY	MMC REPAIR ON 10/1	1	1	1	2	2	
NO	YES	1-2/ DAY	MMC REPAIR ON 21/5	0	0	1	0	2	
NO	YES	1/ DAY	MMC REPAIR FROM E	2	1	1	2	2	
NO	YES	1/ DAY	MMC REPAIR IN MAY	2	2	1	1	2	
NO	YES	1/ DAY	MMC REPAIR FROM E	2	1	1	1	2	
NO	NO	2-3/ DAY	MMC REPAIR ON 4/3/	0	0	0	0	1	
NO	NO	2-3/ DAY	MMC REPAIR ON 29/1	1	1	1	1	2	
NO	NO	1/ DAY	AUGMENTATION OF	2	1	1	2	2	
NO	NO	2-3/ DAY	MMC REPAIR ON 23/8/2009; CIC TRAINING WITH BOWEL WASH ON 19/8/2013						
NO	NO	4-5/DAY	MMC REPAIR ON 2/4/2011; CIC TRAINING ON 22/10/2011						
NO	NO	4-5/ DAY	MMC REPAIR ON 12/10/2011						
NO	NO	2-3/ DAY	MMC REPAIR ON 25/6/2013						
NO	NO	5-6/DAY	MMC REPAIR ON 29/10/2013						
NO	NO	4-5/DAY	MMC REPAIR ON 10/9/2013						
NO	NO	3-4/ DAY	MMC REPAIR ON 14/8/2013						
NO	NO	5-6/ DAY	MMC REPAIR ON 11/9/2013						
NO	NO	3-4/ DAY	MMC REPAIR DONE ON 10/12/2013						
NO	NO	4-5/ DAY	MC REPAIR ON 25/11/2012						
NO	NO	3-4/DAY	MMC REPAIR ON 25/11/2012; CIC TRAINING GIVEN						
NO	NO	2-3/DAY	MMC REPAIR IN JULY 2010 FROM ELSEWHERE; HAD ENDOSCOPIC 3RD VENTRICULOSTOMY 3 MONTHS LATER; BLADDER AUGMEN						
NO	NO	1-2/ DAY	MMC REPAIR DONE ON 25/08/2011, ORCHIDOPEXY LEFT AND CIRCUMCISION ON 27/3/2013						
NO	NO	5-6/ DAY	MMC REPAIR DONE ON 14/09/2013						
NO	NO	5-6/ DAY	MMC REPAIR DONE ON 25/9/2013						
NO	NO	5-6/ DAY	MMC REPAIR DONE ON 26/10/2014						

NO	NO	5-6/DAY	MMC REPAIR DONE ON 23/7/2013
NO	NO	5-6/ DAY	MMC REPAIR DONE ON 5/9/2013
NO	NO	4-5/ DAY	MMC REPAIR DONE ON 14/8/2013
NO	NO	5-6/ DAY	MMC REPAIR DONE ON 16/8/2013
NO	NO	4-5/ DAY	MC REPAIR DONE ON 5/8/2013
NO	NO	5-6/ DAY	MMC REPAIR DONE ON 14/8/2013
NO	NO	5-6/ DAY	LMC REPAIR DONE ON 31/01/2013
NO	NO	4-5/ DAY	MMC REPAIR DOEN ON 26/6/2013
NO	NO	3-4/ DAY	MC REPAIR DONE ON 21/4/2012
NO	NO	2-3/ DAY	MMC REPAIR DONE ON31/5/2012; TRIED CIC TRAINING ON 14/12/2013- OPENING STENOTIC
NO	NO	3-4/ DAY	MMC REPAIR DONE ON9/8/2012; VP SHUNT ON 30/4/2013
NO	NO	2-3/ DAY	MMC REPAIR DONE ON 16/11/2010
NO	NO	3-4/ DAY	MMC REPAIR DONE ON 31/10/2012
NO	NO	3-4/ DAY	MMC REPAIR DONE ON 19/11/2012
NO	NO	3-4/ DAY	MMC REPAIR DONE ON22/11/2012
NO	NO	1-2/ DAY	MMC REPAIR DONE ON 23/2/2012; CIC TRAINING 21/9/2013
NO	NO	1-2/ DAY	MMC REPAIR DONE ON
NO	NO	1-2/ DAY	MC REPAIR DONE ON 30/8/2010
NO	NO	1-2/ DAY	MMC REPAIR DONE ON 30/11/2011
NO	NO	3-4/ DAY	MMC REPIR DONE ON 16/4/2011
NO	NO	2-3/ DAY	MMC REPAIR DONE ON 11/7/2011
NO	NO	2-3/ DAY	MMC REPAIR DONE ON 21/4/2011
NO	NO	2-3/ DAY	BILATERAL END URETEROSTOMY DONE FOR CRF ON 8/6/2012

Q6	Q7	Q8	Q9	Q10	PIN-Q; Q1	Q2	Q3	Q4	
	3	3	2	2	1	4	2	1	3
	3	3	2	2	1	2	2	1	3
	3	3	2	2	1	2	2	4	0
	1	1	0	0	0	0	2	0	0
	2	3	2	1	1	1	0	1	2
	0	1	0	0	0	4	2	3	4
	3	3	2	2	1	1	0	0	1
	3	3	2	2	1	1	0	0	0
	3	3	2	2	1	0	0	0	3
	1	1	0	0	0	2	0	4	1
	3	3	2	2	1	3	0	3	0
	3	3	2	2	1	3	0	3	1
	2	2	1	1	1	3	0	4	0
	3	2	2	2	1	1	1	2	0
	2	1	0	0	0	4	2	1	2
	2	1	0	0	0	4	0	4	4
	3	3	2	2	1	2	0	1	2
	2	2	2	0	0	1	0	3	4
	1	2	1	1	0	0	2	0	0
	3	3	2	2	1	4	4	0	0
	3	3	1	1	1	1	0	3	0
	3	3	2	2	1	3	0	2	3
	3	3	1	2	1	4	2	3	4
	3	3	2	2	1	2	0	2	1
	3	3	2	2	1	1	0	0	1
	3	3	2	2	1	4	0	0	0
	2	3	1	1	0	2	0	4	3
	3	3	2	2	1	0	2	4	0
	3	3	2	2	1	2	0	2	4

T WITH MITROFANOFF, BILATERAL URETERIC REIMPLANT AND BLADDER NECK TIGHTENING DONE ON 13/2/2013

Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	
	3	3	2	0	3	2	0	4	1
	4	4	3	2	3	3	1	2	3
	4	4	4	4	4	4	0	4	4
	0	0	0	0	4	0	0	2	0
	4	2	1	2	0	0	0	0	2
	4	3	2	0	3	0	1	1	3
	4	4	0	4	1	0	0	1	0
	3	4	1	3	2	1	0	0	0
	2	2	0	0	1	0	0	2	0
	4	4	4	4	2	2	2	3	4
	4	4	4	0	1	3	0	3	3
	4	4	4	4	2	3	2	3	3
	4	4	4	0	4	4	4	2	4
	2	2	0	0	0	2	2	2	1
	4	2	2	4	2	2	2	2	4
	4	4	4	0	4	4	0	4	4
	1	1	2	0	2	0	2	2	0
	2	3	2	1	3	2	1	1	3
	0	1	0	0	0	0	0	0	0
	0	0	2	2	0	2	1	2	2
	2	4	3	2	4	0	0	0	1
	4	2	0	2	3	1	2	2	2
	4	2	4	3	3	2	3	4	4
	4	4	4	1	4	4	1	3	4
	4	4	0	3	1	1	0	0	0
	4	4	4	0	4	4	2	4	4
	4	4	4	4	3	1	4	2	4
	4	4	2	2	0	0	0	2	2
	4	3	4	4	2	4	2	4	4

Q14	Q15	Q16	Q17	Q18	Q19	**Q20**	**VISUAL ANALOGUE SCALE**
	2	2	4	3	4	3	0 80%
	2	2	1	2	1	3	2 90%
	2	4	0	4	0	4	4 50%
	0	0	2	0	0	2	0 80%
	0	1	0	0	0	0	0 60%
	3	0	0	4	4	2	2 20%
	0	4	1	3	4	2	2 85%
	0	3	1	3	4	2	2 70%
	0	2	2	4	1	0	0 90%
	3	3	3	3	2	2	3 50%
	3	4	4	4	3	3	3 70%
	3	2	3	4	4	4	3 60%
	3	3	3	4	4	4	3 50%
	3	3	1	2	2	2	2 70%
	4	3	1	2	3	2	3 50%
	4	4	0	4	4	4	4 20%
	0	2	0	0	0	0	0 90%
	2	3	1	3	3	2	2 60%
	0	0	0	0	0	0	0 75%
	2	2	2	1	1	0	3 90%
	2	3	0	3	4	2	1 40%
	3	1	3	3	2	2	3 90%
	3	4	3	4	3	4	4 10%
	1	4	3	2	2	4	2 70%
	0	4	1	3	4	2	2 80%
	4	4	4	4	4	0	4 50%
	3	4	3	1	4	4	3 20%
	2	1	2	2	0	1	2 70%
	4	1	2	2	2	4	2 90%